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# **SITE CHARACTERIZATION/REMEDIATION INVESTIGATION REPORT AOI 10**

**SUNOCO, INC. (R&M)  
PHILADELPHIA REFINERY  
PHILADELPHIA, PENNSYLVANIA**



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**June 29, 2011  
2574601**

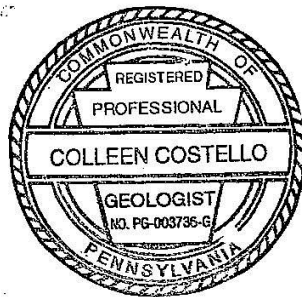
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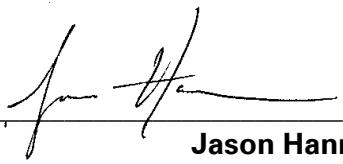
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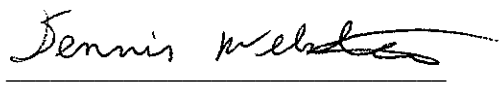
## AOI 10

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## **1.0 INTRODUCTION**

A Current Conditions Report and Comprehensive Remedial Plan (CCR) prepared by Sunoco Inc. (R&M) (Sunoco), dated June 30, 2004, proposed Phase II site characterization and corrective action activities for Sunoco's Philadelphia Refinery (refinery), including preparation of site characterization reports (SCRs) for individual Areas of Interest (AOIs). The CCR presented a prioritization of all eleven AOIs based on specific risk factors. To date, site characterization activities have been completed for nine AOIs at the Refinery. These include: AOI 1 (Belmont Terminal, #1 and #2 Tank Farm), AOI 2 (Point Breeze Processing Area), AOI 3 (Impoundment Area), AOI 4 (#4 Tank Farm), AOI 5 (Girard Point South Tank Field Area), AOI 6 (Girard Point Chemicals Processing Area), AOI 7 (Girard Point Fuels Processing Area), AOI 8 (Point Breeze Process Area North Yard) and AOI 9 (Schuylkill River Tank Farm). Site Characterization Work Plans and Site Characterization Reports for these nine AOIs were submitted to the Pennsylvania Department of Environment Protection (PADEP) and the United States Environmental Protection Agency (EPA).

This Site Characterization/Remedial Investigation Report (SCR/RIR) has been prepared by Langan Engineering and Environmental Services, Inc. (Langan), on behalf of Sunoco for AOI 10 at the refinery. This report has been prepared in accordance with the 2003 Consent Order and Agreement (CO&A) between Sunoco and PADEP and the CCR.

AOI 10, also known as the Point Breeze West Yard (West Yard), is comprised of approximately 80 acres and is located west of the Schuylkill River and south of Passyunk Avenue (Figures 1 and 2). AOI 10 is mostly open space and bounded by Passyunk Avenue to the north-northwest, the Schuylkill River to the east-southeast, and industrial properties to the south and west. Lands Creek, a small tributary of the Schuylkill River, traverses the southern portion of AOI 10 (Figure 1). The current and future intended use of AOI 10 is non-residential.

Four past disposal areas (PDAs 1 through 4) exist in AOI 10. These past disposal areas consist of former lagoons and landfills that received wastes from the refinery under Atlantic Richfield Company ownership during the 1950s and 1960s. PDAs 1 and 2 were capped with clay materials and PDAs 3 and 4 were capped with clay and vegetative cover materials in the 1980s. The PDAs were investigated as part of the 1992 Resource, Conservation and Recovery Act (RCRA) Facility Investigation (RFI) performed by ENSR Consulting and Engineering (ENSR). As part of the RFI activities, the PDAs were grouped into one corrective action management unit (CAMU). This CAMU is the only RCRA waste management unit in AOI 10.

## **1.1 Site History and Background**

The refinery is located in southwest Philadelphia. The refinery has a long history of petroleum transportation, storage, and processing. The oldest portion of the refinery started petroleum-related activities in the 1860s when the Atlantic Refining Company established an oil distribution center. In the 1900s, crude oil processing began and full-scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia were also produced at the refinery for a time. Current operations at the refinery are limited to the production of fuels and basic petrochemicals for the chemical industry. The current and historic uses of AOI 10 are illustrated in a figure provided in Appendix A.

In addition to the PDAs, historic use areas in AOI 10 include a tankage area and associated pump houses in the northeast portion and two fuel docks along the eastern boundary with the river. The structures associated with the tanks and pump houses were demolished prior to 2005. Currently, activities in AOI 10 include maintenance of an existing Sunoco pipeline that is mostly above grade and extends along much of the northern AOI 10 boundary, and an aboveground manifold area that connects underground and aboveground lines between the refinery and the refinery's Schuylkill River Tank Farm.

AOI 10 is located within a fenced and secured area to prevent unauthorized access. Prior to any work being completed within AOI 10, appropriate work permits, safety and security measures must be approved by Sunoco refinery personnel. AOI 10 is under the control of Sunoco's health and safety administrative procedures and is regulated by the Occupational Safety and Health Administration (OSHA). Direct contact to site soils (soils greater than two feet beneath the ground surface) is controlled by Sunoco's on-site permit and personal protective equipment (PPE) procedures.

## **1.2 Selection of Constituents of Concern and Applicable Standards**

The soil and groundwater constituents of concern (COCs) for AOI 10 are listed in Tables 1a and 1b of this report. These COCs are the same as those listed in the CCR, with the exception of two additional constituents: 1,2,4-trimethylbenzene and 1,3,5-

trimethylbenzene. These two constituents were added to the list of COCs based on the PADEP's recent revisions to the petroleum short list of constituents.

Soil samples collected in and around the CAMU were analyzed for Target Compound List (TCL) volatile constituents, semi-volatile constituents, and Target Analyte List (TAL) metals to characterize the waste materials in the CAMU. Surface water samples were analyzed for a modified site COC list that includes total and dissolved TAL metals and hardness as listed in Table 1c. Sediment samples were analyzed for a modified site COC list that included TAL metals, total organic carbon (TOC), particle grain size, and pH as listed in Table 1d.

Data collected from the above-listed activities were evaluated following PA Act 2 procedures as part of the site characterization process.

#### Media of Concern

The media of concern for AOI 10 include groundwater, soil, surface water, and sediment. The potential indoor air quality and off-site vapor migration exposure pathways were evaluated through application of PADEP's vapor intrusion guidance, even though no vapor intrusion receptors currently exist onsite.

#### Act 2 Remediation Standards

The approach for attaining Act 2 remediation standards for the media of concern is described below by media.

#### Groundwater

Groundwater sample results were screened against the PADEP non-residential, used-aquifer (TDS<2,500) statewide health groundwater medium-specific concentrations (MSCs). As summarized in the CCR, where constituent concentrations are above these statewide health MSCs, Sunoco evaluated application of the site-specific remediation standard using either the pathway elimination or calculated risk-based standard options.

#### Shallow Soil – 0 to 2 Feet Interval

Shallow (0-2 feet) soil samples were collected at each soil boring/well location inside and outside the CAMU areas that represents a potential complete direct contact exposure pathway to site workers (e.g., unpaved areas). These shallow soil results

were screened against the PADEP, non-residential statewide health soil MSCs. Based on the depth to groundwater at AOI 10, all shallow soil samples collected were unsaturated; therefore, the MSCs for unsaturated conditions were used when evaluating these data.

As summarized in the CCR, where constituent concentrations are above the MSCs, Sunoco evaluated application of the site-specific remediation standard using either the pathway elimination or calculated risk-based standard options.

#### Soil – 2 to 15 Feet Interval

The site-specific remediation standard using the pathway elimination option was applied for soil between 2 and 15 feet beneath the ground surface within the boundaries of AOI 10 based on Sunoco's existing permit program governing excavations. This permit program serves as an institutional control that prevents potential exposure to impacted soils greater than two feet beneath the ground surface. Soil at this depth is evaluated through the groundwater data.

Soil borings extending beyond two feet were advanced inside and around the perimeters of the CAMU areas to characterize the waste material in the CAMU and the soil conditions beneath and around the perimeters. Samples of the waste materials in the CAMU areas were collected, as were soil samples from beneath the waste. These waste and soil samples were screened against the PADEP, non-residential statewide health soil MSCs. Based on the depth to groundwater at AOI 10, all soil samples collected at depths greater than two feet were considered to be saturated; therefore, the MSCs for saturated conditions were used when evaluating these data.

#### Vapor Intrusion into Indoor Air

Currently there are no buildings in AOI 10. Therefore, there are no potential receptors to vapor intrusion (VI) into indoor air within AOI 10. Soil and groundwater samples collected in AOI 10 were evaluated in accordance with the current Act 2 Vapor Intrusion Guidance, where applicable. The groundwater table is less than five feet below the ground surface in several areas of AOI 10. Soil and groundwater samples collected in these areas were not screened against the default screening numbers in the guidance. In addition, the waste in the CAMU areas is not considered soil-like; therefore, analytical data from the waste samples was not screened.



The refinery is regulated under OSHA; therefore, the appropriate OSHA standard was applied when evaluating the potential indoor air pathway. No soil gas sampling was completed as part of this site characterization, but if future development is proposed for the areas that were not able to be screened using the PADEP vapor screening criteria, soil gas sampling would be completed in these areas.

#### Surface Water

Surface water sample results collected in Lands Creek were screened against the Pennsylvania State Code Title 25, Chapter 93 Water Quality Standards. Direct contact to surface water in Lands Creek is prevented by Sunoco's existing permitting and PPE program; therefore surface water quality was evaluated with respect to potential ecological receptors.

#### Sediment

Sediment sample results from samples collected in Lands Creek were screened using the Severe Ecological Level (SEL) and Low Ecological Level (LEL) sediment screening criteria. Below is a summary of the hierarchy used in selecting the appropriate screening criteria.

- SEL
  - Calculated site-specific SEL using site-specific total organic carbon values.
  - Ontario sediment SEL (if no site specific SEL was available).
- LEL
  - Ontario sediment LEL.
  - National Oceanic Atmospheric Administration (NOAA) effects range low (ERL) sediment benchmark (if no Ontario sediment LEL was available).
  - Sediment EPA Region 5 sediment benchmark (if no NOAA ERL was available).

Direct contact to sediment in Lands Creek is prevented by Sunoco's existing permitting and PPE program; therefore sediment quality was evaluated with respect to potential ecological receptors.

### **1.3 Overview of Investigative Framework and Remedial Approach for AOI 10**

The current remediation program for the Refinery is performed under the 2003 CO&A between PADEP and Sunoco. In April 2004, the PADEP and EPA signed an agreement entitled "One Cleanup Program Memorandum of Agreement (MOA or One-Cleanup Program)," which clarifies how sites remediated under Pennsylvania's Act 2 program may satisfy RCRA corrective action requirements through characterization and attainment of Act 2 remediation standards pursuant to Pennsylvania's Act 2. On November 22, 2005, Sunoco and its representatives met with officials of the PADEP and EPA to discuss the applicability of the Sunoco Philadelphia Refinery to the One Cleanup Program. During the November 22, 2005 meeting, all parties agreed that the One Cleanup Program would benefit the project by merging the remediation obligations under the various programs into one streamlined approach which would be conducted under the existing 2003 CO&A.

As a follow up to the November 22, 2005 meeting, Sunoco submitted a letter dated December 2, 2005 to EPA and PADEP documenting the discussions at the meeting. Sunoco submitted a notice of intent to remediate (NIR) for the Refinery, excluding the Belmont Terminal, to the PADEP on October 12, 2006 and held a public involvement meeting in South Philadelphia on September 19, 2007. A copy of this NIR and the Act 2 report notifications for this SCR/RIR are included in Appendix B.

On March 5, 2009, Sunoco and its representatives met again with EPA to discuss Sunoco Philadelphia Refinery's remediation progress and path forward under the One Clean-Up Program. As a follow up to the meeting, Sunoco submitted a letter dated March 11, 2009 to EPA and PADEP documenting the discussions at the meeting. The major points of this letter are as follows:

- EPA will provide a formal letter that acknowledges that there is a One Clean Up Program Agreement with Sunoco and it's currently operating under one EPA ID Number (PAD049791098) for Point Breeze, Girard Point and Schuylkill River Tank Farm;
- EPA will add in a Corrective Action Module to the Sunoco-submitted Draft Part B RCRA Permit. The module will reference the One Clean-Up Program agreement and the current remediation work being completed under the existing CO&A between PADEP and Sunoco, Inc.; and

- EPA will issue a letter to Sunoco for each characterized SWMU that lists a non-leaded tank bottom designation for which no further action is required.

Sunoco is also developing a report entitled, *Work Plan for Sitewide Approach Under the One Cleanup Program* (Work Plan for Sitewide Approach), to document the Sitewide remedial approach extending beyond the requirements of the 2003 CO&A. DEP and EPA have reviewed and provided input to this report and the final report is expected to be submitted to DEP and EPA in July 2011. In accordance with the Work Plan for Sitewide Approach, all SCRs that have been prepared under the 2003 CO&A will be repackaged as SCR/RIRs and re-submitted to allow for the reports submitted earlier under the CO&A process to be updated with current Act 2 standards and to satisfy the appropriate public and municipal notice provisions of Act 2. To date, SCR/RIRs have been prepared for AOIs 2, 3 and 7. This report is the fourth consecutive report to be submitted as an SCR/RIR.

## **2.0 ENVIRONMENTAL SETTING**

AOI 10 is comprised of approximately 80 acres and is located west of the Schuylkill River and south of Passyunk Avenue (Figures 1 and 2). AOI 10 is mostly open space and bounded by Passyunk Avenue to the north-northwest, by the Schuylkill River to the east-southeast, and by industrial and open properties to the south and west. Lands Creek traverses the southern portion of AOI 10 (Figure 1).

### **2.1 Historic and Current Use**

#### Historic Use

A detailed review of historical aerial photographs for AOI 10 is provided in Appendix B of the Work Plan. Based on a review of historical aerial photographs, several ASTs once existed in the northeastern and western portions of AOI 10 (Figure A-1 in Appendix A). Four PDAs exist in the topographically high areas of AOI 10 (Figure A-1 in Appendix A). PDAs 3 and 4 received primarily trash construction rubble, leaded tank bottom and separator sludges and spent catalyst during the 1950s. PDAs 1 and 2 received acid wastes, caustic waste, asphalt, coal slag, paraffin, bender catalyst and leaded sludge in the 1950s and 1960s. PDAs 1 and 2 were capped with clay materials and PDAs 3 and 4 were capped with clay and vegetative cover materials in the 1980s. The PDAs were

investigated as part of the 1992 RFI performed by ENSR. As part of the RFI activities, the PDAs were grouped into a CAMU. This CAMU is the only RCRA waste management unit in AOI 10. Other historic use areas in AOI 10 include a tankage area and associated pump houses in the northeast portion and two fuel docks along the eastern boundary with the river (Figure A-1 in Appendix A). The structures associated with the tanks and pump houses were demolished prior to 2005.

Currently, activities in the West Yard include maintenance of an existing Sunoco pipeline that is mostly above grade and extends along much of the northern AOI 10 boundary, and an aboveground manifold area that connects underground and aboveground lines between the refinery and Schuylkill River Tank Farm.

## **2.2 Geology**

To further characterize geology at AOI 10, Sunoco advanced seven shallow and two intermediate monitoring wells. Shallow well borings were advanced into the fill/alluvium materials beneath AOI 10. Intermediate well borings were advanced into the Trenton Gravel beneath the fill/alluvium and above bedrock. Each shallow and intermediate boring was continually logged by a field geologist. The boring logs are provided in Appendix C. To illustrate the geology at AOI 10, two geologic cross sections were prepared and are provided as Figures 4a and 4b in this report. The cross section location lines are shown in plain view on these figures.

The following paragraphs describe the primary geologic units beneath AOI 10 beginning with the deepest unit to the shallowest unit:

**Wissahickon Formation** – Bedrock beneath the refinery and AOI 10 is identified as the Wissahickon Schist. This formation is a metamorphosed greenish-gray micaceous schist and quartzite. The competent bedrock of the Wissahickon Formation is overlain by weathered bedrock consisting of micaceous clay, which becomes increasingly sandy as the degree of weathering lessens and competent bedrock is encountered. Based on deep well and soil borings completed in AOI 10, the Wissahickon Schist ranges between approximately 30 and 80 feet beneath the ground surface. The bedrock elevation rises to the west. This range in bedrock depth is illustrated in Figures 4a and 4b.

**Lower Sand Unit of the PRM** – Throughout the majority of the Refinery, the Wissahickon Formation is overlain by the Lower Sand, which is the lowest member of the Potomac-Raritan Magothy (PRM) Aquifer System. Based on recent geologic data collected in AOI 10, the Lower Sand does not exist beneath AOI 10.

**Middle/Lower Clay** – The Middle/Lower Clay, where present beneath the refinery, is characterized by very low permeability reddish-brown, brown or gray clays and sandy clays. Based on recent geologic data collected in AOI 10, the Middle/Lower Clay does not exist beneath AOI 10. As shown in Figures 4a and 4b, some clay is present immediately above bedrock. The clay is absent in the western portions of AOI 10. As shown in Figures 4a and 4b, the clay, where present, ranges in thickness between approximately 2 feet to 5 feet.

**Trenton Gravel** – Throughout most of the refinery, the Trenton Gravel typically overlies the Middle/Lower Clay and Lower Sand with thicknesses up to 80 feet and a typical thickness of 40 feet. The Trenton Gravel is of Pleistocene Age (Ice Age; less than 2 million years) and is a very heterogeneous unit comprised of a predominant brown to gray sand, gravel and minor amounts of clay (Owens and Minard, 1979). As shown in Figures 4a and 4b, Trenton Gravel is present throughout AOI 10 above bedrock and beneath alluvium. The Trenton Gravel is approximately 10 feet thick in the western portion of AOI 10 and thickens to approximately 30 feet along the eastern portion of AOI 10.

**Recent Fill/Alluvium** - The alluvium deposits in AOI 10 generally consist of dark gray organic clayey mud or silt and fine sand. As shown in Figures 4a and 4b, alluvium deposits are approximately 50 to 65 feet thick in the eastern and northeastern portions of AOI 10 and thin to between 10 to 35 feet in the western and southern portions of AOI 10. As shown in Figures 4a and 4b, the alluvium thickens in the eastern portion of AOI 10 where the Pleistocene age deposits have been eroded and replaced. At these locations, the alluvium deposits are in direct contact with the Trenton Gravel.

Fill type varies across AOI 10 and includes various sands and gravels, brick and wood fragments, and cinder ash. Fill overlies the native alluvium throughout AOI 10 and ranges between 5 and 25 feet in thickness.

Based on the soil borings advanced through the CAMU areas, cover materials over the waste are present at thicknesses ranging between 2.5 and 12 feet. Waste materials in the CAMU areas range in thickness between 5 and 20 feet and lie on top of the alluvium (Figures 4a and 4b).

In addition to the above descriptions, the following general observations can be made concerning the geology in AOI 10:

- Fill materials are present throughout AOI 10;
- Alluvium is present beneath AOI 10 and thickens in a wedge shape towards the river;
- Trenton Gravel is present in all portions of AOI 10 beneath the alluvium and thins towards the river where the gravel has been eroded and replaced by the alluvium;
- The Middle/Lower Clay is absent in AOI 10; however, some clay is present immediately above bedrock in some locations;
- The Lower Sand is absent in AOI 10; and
- The depth to bedrock beneath AOI 10 increases towards the east. The shallowest depth to bedrock in the west is approximately 30 feet and the deepest depth to bedrock in the east is approximately 80 feet.

## **2.3 Hydrogeology**

### 2.3.1 Shallow Groundwater Occurrence and Flow

Shallow groundwater in AOI 10 refers to unconfined groundwater that occurs in either the fill or alluvium (or both). Well construction details for these monitoring wells are provided in Table 2 and boring/well construction logs for the newly-installed wells are provided in Appendix C of this report. Groundwater gauging data collected by Stantec in April 2011 was used to generate a groundwater flow figure for the shallow zone in AOI 10 (Figure 5). The groundwater elevation data from this gauging event is provided in Table 3. Historic boring/well logs for wells installed prior to the site characterization activities are provided in Appendix D of the CCR.

Shallow groundwater flow within AOI 10 is described below:

- Groundwater in the shallow zone of AOI 10 occurs at depths ranging between 1 and 13 feet below the ground surface under unconfined conditions;
- Groundwater flow in the eastern portion of AOI 10 is to the east towards the Schuylkill River and groundwater flow in the western portion of AOI 10 is to the south;
- The hydraulic gradient in the western portion of AOI 10 is relatively flat (average gradient= 0.003 ft/ft) and steepens along the Schuylkill River (average gradient = 0.016 ft/ft);
- The vertical hydraulic gradient between the shallow and intermediate (Trenton Gravel) zones is downward at an average of 0.325 ft/ft.

### 2.3.2 Intermediate Groundwater Occurrence and Flow

Intermediate groundwater at AOI 10 refers to unconfined groundwater that occurs in Trenton Gravel situated beneath the alluvium. Six intermediate wells are located in AOI 10. These include: W-1D, W-9, W-13, W-19, W-26, and W-32D. Well construction details for these wells are provided in Table 2 and the available logs for these wells are provided in Appendix D of the CCR. Groundwater gauging data collected by Stantec in April of 2011 was used to generate a groundwater flow figure for the intermediate groundwater zone in AOI 10 (Figure 6). The groundwater elevation data from this gauging event is provided in Table 3.

Intermediate groundwater flow within AOI 10 is described below:

- Intermediate groundwater in AOI 10 occurs at depths ranging between 6 to 10 feet below the ground surface;
- Groundwater flow in the intermediate zone is towards the southwest under a low hydraulic gradient (average gradient = 0.0006 ft/ft); and
- The vertical hydraulic gradient between the shallow and intermediate (Trenton Gravel) zones is downward at an average of 0.325 ft/ft.

## **2.4 Surface Water**

AOI 10 is mostly open space and bounded by Passyunk Avenue to the north-northwest, by the Schuylkill River to the east-southeast. Lands Creek traverses the southern portion of AOI 10 (Figure 1). As shown on Figure 1, Lands Creek is shown as a blue line stream. The surface water area of the creek is greater than 1,000 square feet and is not a permitted open water management area. The creek is a freshwater tidally influenced drainage feature which drains into the Schuylkill River. The creek is designated by PA as a warm water fishes stream. The confluence of Lands Creek and the Schuylkill River is in the southeast corner of AOI 10.

## **3.0 SITE CHARACTERIZATION ACTIVITIES**

The following sections summarize the site characterization activities that were completed in AOI 10 in support of this SCR/RIR. Site characterization activities were performed between April and May 2011, by Aquaterra Technologies, Inc. (Aquaterra) and Langan in coordination with Sunoco. These activities were executed in accordance with the AOI 10 Work Plan for Site Characterization. In addition to the activities performed under the work plan, Stantec completed site characterization activities to address a vacuum gas oil (VGO) release in April 2010. All site characterization activities are discussed in the following sections.

### **3.1 Soil Borings and Sampling Outside of CAMU Areas**

A total of 45 soil samples were collected for analysis of site COCs from areas within AOI 10 outside the CAMU. The locations of all soil and monitoring well borings are shown on Figure 3 and the boring logs are provided in Appendix C. Soil samples were collected utilizing macrocore sampling techniques. Soil borings outside the CAMU areas were advanced from depths ranging between 2 to 20 feet below grade using hollow-stem auger techniques in accordance with the Work Plan for Site Characterization.

Soil samples collected from these borings were submitted to Lancaster Laboratories, Inc. (LLI) of Lancaster, Pennsylvania for analysis of site COCs. A summary of the soil analytical results screened against the PADEP non-residential soil MSCs is provided in



Tables 4 and 5, and the results are discussed in Section 4.1. The laboratory analytical reports are provided as Appendix D.

### **3.2 Soil Borings and Sampling within CAMU Areas**

A total of nine soil borings ranging in depths between 20 and 30 ft bgs were completed in the CAMU areas in accordance with the Work Plan. The purpose of these soil borings was to characterize the potential direct contact to shallow soil exposure pathway, characterize and delineate the waste material in the CAMU and characterize the soil beneath the waste in the CAMU. Soil borings were advanced utilizing hollow stem augers and macrocore sampling device. The locations of all soil and monitoring well borings are shown on Figure 3 and the boring logs are provided in Appendix C.

Soil samples were submitted to LLI of Lancaster, Pennsylvania for analysis of site COCs. A summary of the soil analytical results screened against the PADEP non-residential soil MSCs is provided as Tables 6, 7 and 8 and the results are discussed in Section 4.2. The laboratory analytical reports are provided as Appendix D.

### **3.3 Vacuum Gas Oil Release Cleanup**

A release of VGO from a manifold area located in the northeastern portion of AOI 10 occurred in March 2010. The release was reported to be up to approximately 1,500 barrels of VGO. Remediation and post postremediation sampling programs were implemented by Sunoco. Sunoco directed the cleanup operations which included recovery of VGO by vacuum truck and excavation and disposal of impacted soils. Stantec performed post-excavation confirmatory soil sampling. Post-excavation soil samples were analyzed for site COCs as listed in the CCR. Locations of the post-excavation soil samples are illustrated on Figure 9 and the results of the sampling are discussed in Section 4.3. The laboratory analytical report for the samples is included in Appendix D.

### **3.4 Installation of Groundwater Monitoring Wells**

Well installation activities were performed in April 2011 by Parrat Wolff, Inc. (PWI) of East Syracuse, New York under direct supervision of Aquaterra and Langan, and in coordination with Sunoco. The locations of all monitoring wells installed are shown on

Figure 3. Monitoring wells were installed to monitor the water table aquifers beneath AOI 10. The well installation activities are discussed in the following sections.

#### 3.4.1 Shallow Groundwater Monitoring Wells

PWI installed seven shallow monitoring wells (fill/alluvium) under the direct supervision of Aquaterra and Langan. All wells were installed and constructed in accordance with the Work Plan. Locations of these wells are shown on Figure 3. Well borings were advanced utilizing 8.25-inch inside diameter hollow stem augers and macrocore samplers to record lithology. Monitoring wells were constructed to a maximum depth of 12 feet below grade with screen intervals between 2 and 12 feet, with the maximum screen length being 10 feet. Boring logs depicting monitoring well construction details and lithology are provided as Appendix C. Monitoring wells were constructed with a stickup steel casing for protection. Well construction details are provided in Table 2.

Following construction, the wells were developed in accordance with the Work Plan.

#### 3.4.2 Intermediate Groundwater Monitoring Wells

Four intermediate groundwater monitoring wells previously existed in AOI 10. These wells include: W-9, W-13, W-19, and W-26. Two new intermediate wells (W-1D and W-32D) were installed as part of the site characterization activities. The locations of these intermediate monitoring wells are shown on Figure 3. Well construction details are provided in Table 2 and soil boring/well construction logs are provided in Appendix C. Geologic information obtained from the deep soil borings completed in AOI 10 was used to prepare geologic cross sections provided as Figures 4a and 4b.

### **3.5 Groundwater Monitoring**

On April 27, 2011, Aquaterra performed monitoring well gauging activities to collect liquid levels from monitoring points within AOI 10. Monitoring points were gauged for depth-to-water, and if applicable, depth-to-product in accordance with the Work Plan. All monitoring point gauging readings are summarized in Table 3.

The groundwater monitoring data from Table 3 was used to generate shallow and intermediate groundwater elevation contours provided as Figures 5 and 6, respectively.

### **3.6 Groundwater Sampling**

Aquaterra performed a round of groundwater sampling from all accessible wells in AOI 10 between April 26 and 27, 2011. All groundwater sampling activities were completed using three well volume purging techniques in accordance with the AOI 10 Work Plan. The monitoring well sampling summary data sheets are provided as Appendix E.

Following well purging activities, groundwater samples were collected by lowering a disposable bailer slowly into the monitoring well to minimize excess agitation. The bailer was filled with water from the top of the water table and retrieved. Samples were then collected in laboratory-prepared bottleware and immediately placed on ice. Samples were submitted to LLI for analysis of site COCs listed in Table 1b. Once the sample was collected, the bailer, bailer cord, and nitrile gloves used to obtain the sample were discarded. Sample date, time, number, and site name were recorded on the chain-of-custody and in field books. For groundwater samples analyzed for lead, LLI filtered the samples to analyze for dissolved concentrations.

The groundwater analytical results for shallow wells were screened against the PADEP non-residential groundwater MSCs and are presented in Table 9. The groundwater analytical results for the intermediate wells are presented in Table 10. The laboratory analytical reports are included as Appendix D.

### **3.7 Surface Water and Sediment Sampling**

On April 7, 2011, Aquaterra and Langan performed surface water and sediment sampling activities at Lands Creek. Sediment and surface water samples were collected from five locations. These sample locations are shown on Figure 3. All samples were collected in accordance with the Work Plan.

Surface water and sediment samples were submitted to LLI of Lancaster, Pennsylvania for analysis of COCs as listed in Table 1c and 1d, respectively. A summary of the analytical results screened against the appropriate screening criteria is provided as

Tables 11 and 12 and the results are discussed in Section 4.5. The laboratory analytical reports are provided as Appendix D.

### **3.8 LNAPL Sampling**

Light non-aqueous phase liquid (LNAPL) samples for select wells in AOI 10 were previously characterized as described in the CCR. As part of the site characterization activities, Aquaterra collected LNAPL samples from three existing monitoring wells in AOI 10 to further characterize LNAPL in AOI 10. The wells included W-8, W-14, and W-18. LNAPL samples were collected using a direct sampling method in accordance with the Work Plan. LNAPL samples were packaged in certified hazardous material shipping boxes and shipped to Torkelson Laboratories (Torkelson) of Tulsa, Oklahoma for LNAPL characterization. LNAPL characterization data included product types, density, proportions of product, degree of weathering, and similarities to other LNAPL samples collected at the Refinery.

Appendix F summarizes the LNAPL characterization results for all samples collected in AOI 10 as well as previous results from the CCR.

### **3.9 Surveying Activities**

Following completion of well installation and soil boring activities, the newly-installed monitoring wells and soil boring locations were surveyed by Langan to establish the location and elevation of the inner and outer casing and ground surface at each point. All well elevations were determined to the nearest 0.01 foot relative to mean sea level. All survey activities were performed by a Pennsylvania-licensed surveyor and tied to the NAVD 88 datum. The new survey data for the monitoring wells is presented in Table 2. This new survey data was used to update the Geographic Information System (GIS) and site wide database for the Refinery.

## **4.0 SITE CHARACTERIZATION ANALYTICAL RESULTS**

The following sections discuss the results of the site characterization activities performed in AOI 10.

#### **4.1 Soil Analytical Results for Samples Collected Outside of CAMU Areas**

The results of the soil samples collected outside of the CAMU areas are provided in Tables 4 and 5. Table 4 includes soil sample results from samples that were collected from shallow borings outside the CAMU areas. These soil samples were analyzed for the site COCs only (Table 1b). Table 5 includes shallow soil sample results from samples collected around the perimeter of the CAMU areas (horizontal delineation borings). These soil samples were analyzed for TCL VOC, SVOC and TAL Metals lists, which are broader than the site COC list. All of the soil samples were collected between zero to two feet below grade and no saturated soils were observed in this interval. The soil sample results were screened against the PADEP non-residential soil MSCs for unsaturated soils. Soil samples with results above their respective soil MSCs are shown in Figure 7.

Below is a general summary of the screening results:

- COCs detected in soil above their respective non-residential soil MSCs included: benzene, benzo(a)pyrene, PCE, arsenic, manganese, and lead; and
- All other COCs analyzed in Tables 4 and 5 were below their respective non-residential soil MSCs.

#### **4.2 Soil Results within CAMU Areas**

The results of the samples collected inside the CAMU are provided in Tables 6, 7 and 8. Table 6 includes results from soil samples that were collected from 0 and 2 feet below the ground surface above the waste. Table 7 includes results from waste samples collected from the waste inside the CAMU areas (cover materials). Table 8 includes results from soil samples collected beneath the waste inside the CAMU areas (vertical delineation borings). These soil samples were analyzed for TCL VOC, SVOC and TAL Metals lists, which is an expanded list from the site COC list. The soil sample results were screened against the PADEP non-residential soil MSCs. Soil samples with results above their respective soil MSCs are shown in Figure 8. Below is a summary by depth interval of the screening results:

Shallow Soil Samples:

- COCs detected in shallow soil above their respective non-residential soil MSCs included: benzo(a)pyrene, dibenzo(a,h)anthracene, manganese and lead.
- All other COCs were below their respective non-residential soil MSCs.

Waste Samples:

- COCs detected in waste samples above the non-residential soil MSCs included: benzene, methylene chloride, PCE, ethylbenzene, toluene, 1,2-DCE, 2-methylnaphthalene, benzo(a)pyrene, naphthalene, dibenzofuran, antimony, arsenic, barium, cobalt, lead, manganese, mercury, nickel, thallium, and zinc.
- All other COCs analyzed were below their respective non-residential soil MSCs.

Vertical Delineation Soil Samples:

- COCs detected in the vertical delineation soil samples (collected beneath the waste) above the non-residential soil MSCs included: benzene, benzo(a)pyrene, naphthalene, arsenic, barium, cobalt, lead, manganese, mercury, nickel, and thallium.
- All other COCs analyzed were below their respective non-residential soil MSCs.

#### **4.3 Vacuum Gas Oil Release Area - Post Excavation Soil Sample Results**

Stantec collected a total of 10 unsaturated, post-excavation soil samples following the excavation of VGO-impacted soil. The locations of the soil samples are shown in Figure 9. The samples were analyzed for site COCs as listed in the CCR. The results of the soil samples are screened against the DEP non-residential soil MSCs in Table 9. All soil samples analyzed for site COCs were below their respective non-residential soil MSCs.

#### **4.4 Groundwater Results**

The results of the groundwater samples collected from shallow and intermediate monitoring wells are provided in Tables 10 and 11, respectively. The results were screened against the PADEP non-residential used aquifer (TDS<2,500) groundwater MSCs. Locations with concentrations above the groundwater MSCs are illustrated in

Figure 10. A summary of the COC concentrations observed in both the shallow and intermediate wells is provided below.

#### Shallow Wells

- COCs at concentrations above their respective non-residential groundwater MSCs included: benzene, chrysene, naphthalene, and lead.
- All other COCs analyzed in Table 10 were below their respective non-residential groundwater MSCs.

#### Intermediate Wells

- There were no COCs detected in intermediate wells above their respective non-residential groundwater MSCs.

### **4.5 Surface Water and Sediment Results**

#### Surface Water

The locations of the five surface water samples collected from Lands Creek are shown in Figure 3. The samples were submitted for analysis of COCs listed in Table 1c. The results of the samples were screened against the 25 Pa. Code, Chapter 93 Fish and Aquatic Life criteria in Table 12. To calculate the criteria for constituents that require hardness data, site-specific hardness data collected at each sampling location was used. Total and dissolved surface water samples were analyzed.

Based on the results of the screening, no COCs (both total and dissolved) were detected in the surface water samples at concentrations above their respective Chapter 93 screening criteria.

#### Sediment

The locations of the five sediment samples collected from Lands Creek are shown in Figure 3. The sediment samples were collected at the same locations as the surface water samples and were submitted for analysis of COCs listed in Table 1d. Results of the samples were screened against the EPA Region 3 Biological Technical Assistance Group (BTAG) sediment and surface water benchmarks and the LEL and SEL in Table 13. Sample locations exhibiting COC concentrations above these sediment screening criteria are depicted on Figure 11. Total organic carbon data was collected at

each sample location and was used to calculate site-specific SEL criteria where required.

Based on the results of the screening, no volatile organic constituents exceeded the sediment screening criteria. Below is a summary of the semi-volatile organic constituents and metal results that were above the sediment screening criteria:

- COCs which were detected above the SEL included: anthracene, benzo(ghi)perylene, chrysene, phenanthrene, pyrene, arsenic, chromium (total), copper, iron, lead, manganese, mercury, nickel, and zinc.

#### **4.6 LNAPL Characterization Results**

During the April 2011 gauging event, three monitoring wells in AOI-10 (W-8, W-14, and W-18) had measurable LNAPL ranging in thickness between 0.01 and 0.59 ft. As part of the site characterization activities, LNAPL samples were collected from each of the three wells and submitted to Torkelson Geochemistry, Inc. of Tulsa, Oklahoma for characterization. Appendix F summarizes the LNAPL characterization results from the CCR and the recent site characterization activities and also includes the laboratory data reports for the sampled wells. Based on the LNAPL characterization performed by Torkelson, the LNAPL types present in AOI 10 include extremely weathered residual oil in W-8 and extremely weathered residual oil/middle distillate in monitoring wells W-14 and W-18.

LNAPL modeling, using the API model was completed as part of the 2004 CCR to evaluate specific volume and LNAPL mobility for product in some of these wells. The LNAPL type, absence of LNAPL in the surrounding monitoring wells, groundwater flow direction, and the LNAPL modeling performed as part of the CCR, all suggest LNAPL in these wells is stable and immobile. Therefore, no additional LNAPL modeling was completed as part of this SCR/RIR.

LNAPL occurrence in AOI 10 is illustrated in Figure 12.

## **5.0 REMEDIAL SYSTEMS**

There are no active remediation systems currently operating in AOI 10.



## **6.0 FATE AND TRANSPORT ANALYSIS**

The following sections describe fate and transport modeling activities performed as part of AOI 10 site characterization.

### **6.1 Soil**

No fate and transport modeling was completed for the soil analytical results since the only potential exposure pathway to soil is by direct contact to shallow soil. The soil-to-groundwater pathway is evaluated through groundwater data. Potential exposure pathways for AOI 10 are discussed in more detail in Section 8.0.

### **6.2 Groundwater**

Fate and transport modeling was completed for eight wells in AOI 10 (W-1, W-12, W-23, W-28, W-31, W-32, W-33, and W-34) that exhibited concentrations of COCs above their respective PADEP non-residential groundwater MSCs. The modeling was performed to evaluate whether concentrations of COCs in groundwater, above MSCs, have the potential to reach the AOI boundary or Lands Creek.

Fate and transport modeling was performed using the Quick Domenico (QD) model. The QD Version 2 spreadsheet model and either PADEP default or site-specific data were used to perform the fate and transport calculations. A more detailed description of QD model input parameters and results are presented in Appendix G. Input and result summary spreadsheets for each monitoring well modeled are included in Appendix G (Tables G.1 through G.9). The results of the QD screening are located in Table G.5. A comparison between the model-predicted downgradient transport distance and the distance to the nearest property boundary and/or surface water receptor is also included in these tables.

The modeling results indicate concentrations above the groundwater MSCs in shallow wells W-1, W-12, W-23, W-28, W-31, W-32, and W-34 are not predicted to migrate beyond the AOI 10 boundary, with the exception of one well, W-33, which contains a concentration of benzene that has the potential to reach Lands Creek. However, the

predicted benzene concentration at the Lands Creek boundary is below the 25 Pa. Code Chapter 93 surface water quality criteria for benzene.

### **6.3 Surface Water**

Based on the results of the QD simulations, groundwater concentrations above the MSCs are not expected to reach the Schuylkill River. In addition, surface water samples collected from Lands Creek exhibited no COC concentrations above the 25 Pa. Code Chapter 93 screening criteria.

### **6.4 LNAPL**

Wells W-8, W-14, and W-18 were the only wells in AOI 10 that contained measurable LNAPL. Based on the LNAPL type and mobility, degree of severe LNAPL weathering, absence of LNAPL in the surrounding monitoring wells, groundwater flow/gradients, and the LNAPL mobility modeling performed as part of the CCR, LNAPL in these wells is considered to be stable and immobile. Therefore, no additional LNAPL modeling was completed as part of this SCR/RIR.

### **6.5 Vapor Intrusion into Indoor Air**

Currently there are no occupied buildings in AOI 10. Therefore, there are no potential receptors to vapor intrusion (VI) into indoor air within AOI 10. Soil and groundwater samples collected in AOI 10 were evaluated in accordance with the current Act 2 Vapor Intrusion Guidance, where applicable. The groundwater table is less than five feet below the ground surface in several areas of AOI 10. Groundwater and soil samples collected in these areas were not screened against the default screening numbers in the guidance. In addition, the waste in the CAMU areas is not considered soil-like; therefore, analytical data from the waste samples was not screened. The refinery is regulated under OSHA; therefore, the appropriate OSHA standard was applied when evaluating the potential indoor air pathway. The screening evaluation using applicable soil and groundwater data indicated that no soil or groundwater analytical results in AOI 10 are above the non-residential EPA/PADEP default screening values or the OSHA PEL screening values.

No soil gas sampling was completed as part of this site characterization, but if future development is proposed for the areas that were not able to be screened using the PADEP vapor screening criteria, soil gas sampling would be completed in these areas.

## **7.0 SITE CONCEPTUAL MODEL**

A preliminary site conceptual model (SCM) for the Refinery, including AOI 10, was presented in the CCR. Data collected from the recent site characterization activities performed in AOI 10 were used to refine the SCM for this area. The revised SCM for AOI 10 is described in the following sections:

### **7.1 Description and Site Use**

The current and future intended use of AOI 10 is non-residential. AOI 10 is located west of the Schuylkill River across from the northern portion of the South Yard. It is bordered by Passyunk Avenue to the North, the Schuylkill River to the Southeast and other industrial properties to the southwest. Lands Creek traverses the southern portion of AOI 10.

Based on a review of historical aerial photographs, several ASTs once existed in the northeastern and western portions of AOI 10 (Figure A-1 in Appendix A). Four PDAs exist in the topographically high areas of AOI 10 (Figure A-1 in Appendix A). PDAs 3 and 4 received primarily trash construction rubble, leaded tank bottom and separator sludges and spent catalyst during the 1950s. PDAs 1 and 2 received acid wastes, caustic waste, asphalt, coal slag, paraffin, bender catalyst and leaded sludge in the 1950s and 1960s. PDAs 1 and 2 were capped with clay materials and PDAs 3 and 4 were capped with clay and vegetative cover materials in the 1980s. Other historic use areas in AOI 10 include a tankage area and associated pump houses in the northeast portion and two fuel docks along the eastern boundary with the river (Figure A-1 in Appendix A). The structures associated with the tanks and pump houses were demolished prior to 2005.

Currently, activities in the West Yard include maintenance of an existing Sunoco pipeline that is mostly above grade. The pipeline extends along much of the northern AOI 10

boundary and an aboveground manifold area that connects underground and aboveground lines between the refinery and Schuylkill River Tank Farm.

AOI 10 is located within a fenced and secured area to prevent unauthorized access. Prior to any work being completed within AOI 10, appropriate work permits, safety and security measures must be approved by Sunoco Refinery personnel. AOI 10 is under the control of Sunoco's health and safety administrative procedures and is regulated by OSHA. Direct contact to site soils (soils greater than two feet beneath the ground surface) is controlled by Sunoco's on-site permit and personal protective equipment (PPE) procedures.

## **7.2 Geology and Hydrogeology**

The following summarizes relevant information concerning geology and hydrogeology in AOI 10:

### Geology

- Fill materials are present throughout AOI 10;
- Waste materials in the PDAs range in thickness between 5 and 20 feet thick;
- Alluvium is present beneath AOI 10 and thickens in a wedge shape towards the river;
- Trenton Gravel is present in all portions of AOI 10 beneath the alluvium and thins towards the river where the gravel has been eroded and replaced by the alluvium;
- The Middle/Lower Clay is absent in AOI 10; however, some clay is present immediately above bedrock in some locations;
- The Lower Sand is absent in AOI 10; and
- The depth to bedrock beneath AOI 10 increases towards the east. The shallowest depth to bedrock in the west is approximately 30 feet and the deepest depth to bedrock in the east is approximately 80 feet.

### Hydrogeology

- Groundwater in the shallow zone of AOI 10 occurs at depths ranging between 1 and 13 feet below the ground surface under unconfined conditions;

- Groundwater flow in the eastern portion of AOI 10 is to the east towards the Schuylkill River and groundwater flow in the western portion of AOI 10 is to the south;
- The hydraulic gradient in the western portion of AOI 10 is relatively flat (average = 0.003 ft/ft) and steepens along the Schuylkill River (average gradient = 0.016 ft/ft);
- Intermediate groundwater in AOI 10 occurs at depths ranging between 6 to 10 feet below the ground surface;
- Groundwater flow in the intermediate zone is towards the southwest under a low hydraulic gradient (average gradient = 0.0006 ft/ft); and
- The vertical hydraulic gradient between the shallow and intermediate (Trenton Gravel) zones is downward at an average of 0.325 ft/ft.

### **7.3 Constituents of Concern**

The following summarizes relevant information concerning COCs in AOI 10:

#### **Soil Samples Collected Outside of CAMU Areas**

Shallow soil samples were collected outside the CAMU areas and deeper soil samples were collected around the perimeter of the CAMU areas to horizontally delineate the extent of the waste in the CAMUs. In addition, post-excavation soil samples were collected from the area of the VGO release. The results of these soil samples are summarized below:

- COCs detected in soil above their respective non-residential soil MSCs included: benzene, benzo(a)pyrene, PCE, arsenic, manganese, and lead; and
- All other COCs were below their respective non-residential soil MSCs, including all of the post-excavation samples.

#### **Soil Samples Collected Inside CAMU Areas**

Soil samples were collected from three depth intervals inside the CAMU areas. These intervals correspond to soil materials above the waste, waste and soil materials beneath the waste. The results of the soil samples are summarized below by corresponding depth interval:

#### Shallow Soil Samples:

- COCs detected in shallow soil above their respective non-residential soil MSCs included: benzo(a)pyrene, dibenzo(a,h)anthracene, manganese and lead.
- All other COCs were below their respective non-residential soil MSCs.

#### Waste Samples:

- COCs detected in waste samples above the non-residential soil MSCs included: benzene, methylene chloride, PCE, ethylbenzene, toluene, 1,2-DCE, 2-methylnaphthalene, benzo(a)pyrene, naphthalene, dibenzofuran, antimony, arsenic, barium, cobalt, lead, manganese, mercury, nickel, thallium, and zinc.
- All other COCs analyzed were below their respective non-residential soil MSCs.

#### Vertical Delineation Soil Samples:

- COCs detected in the vertical delineation soil samples (collected beneath the waste) above the non-residential soil MSCs included: benzene, benzo(a)pyrene, naphthalene, arsenic, barium, cobalt, lead, manganese, mercury, nickel, and thallium.
- All other COCs analyzed were below their respective non-residential soil MSCs.

### **Groundwater**

Groundwater samples were collected from all wells that did not contain LNAPL. This included wells that screen both the shallow and intermediate zones. The results of the groundwater samples are summarized below by corresponding hydrogeologic zone:

#### Shallow Wells

- COCs at concentrations above their respective non-residential groundwater MSCs included: benzene, chrysene, naphthalene, and lead.
- All other COCs were below their respective non-residential groundwater MSCs.

#### Intermediate Wells

- There were no COCs detected in intermediate wells above their respective non-residential groundwater MSCs.

The exposure assessment completed for the COCs above the MSCs is discussed in Section 8.0 of this report.

### **Surface Water**

Five surface water samples were collected from Lands Creek. None of the samples exhibited concentrations of COCs above their respective 25 Pa. Code Chapter 93 screening criteria.

### **Sediment**

Five sediment samples were collected from Lands Creek at locations corresponding to the surface water samples. The results of the sediment samples are summarized below:

- No VOC concentrations were above the sediment screening criteria.
- SVOCs and metals detected above the SEL included: anthracene, benzo(ghi)perylene, chrysene, phenanthrene, pyrene, arsenic, chromium (total), copper, iron, lead, manganese, mercury, nickel, and zinc.

## **7.4 LNAPL Distribution and Mobility**

The following summarizes relevant information concerning LNAPL distribution in AOI 10:

- W-8, W-14, and W-18 contained measurable LNAPL and the product type is identified as extremely weathered residual oil and/or residual oil/middle distillate.
- The occurrence of LNAPL does not correlate with the COC concentrations which were above MSCs in shallow groundwater in these areas.
- Based on LNAPL modeling performed for the CCR, the LNAPL type, degree of weathering, groundwater flow/gradients, the absence of LNAPL in the surrounding monitoring wells, and the occurrence of LNAPL in these wells over time, LNAPL in these wells is considered to be stable and immobile.

## **7.5 Fate and Transport of COCs**

- No fate and transport modeling was completed for the soil analytical results since the only potential exposure pathway to soil is by direct contact. The soil-

to-groundwater pathway is evaluated through groundwater data.

- Fate and transport calculations were completed for groundwater in AOI 10 to evaluate potential migration pathways/potential impacts to receptors. Eight wells (W-1, W-12, W-23, W-28, W-31, W-32, W-33, and W-34) in AOI 10 exhibited concentrations of groundwater COCs above their respective MSCs. The results from these wells were modeled using the QD model to determine whether COC concentrations could potentially reach the AOI 10 boundary. The modeling results indicate concentrations above the groundwater MSCs in shallow wells W-1, W-12, W-23, W-28, W-31, W-32, and W-34 are not predicted to migrate beyond the AOI 10 boundary, with the exception of one well, W-33, which contains a concentration of benzene that has the potential to reach Lands Creek. However, the predicted benzene concentration at the Lands Creek boundary is below the 25 Pa. Code Chapter 93 surface water quality criteria for benzene.

## **7.6 Potential Migration Pathways and Site Receptors**

The following summarizes potential migration pathways and site receptors for AOI 10.

- AOI 10 is situated within a fenced, secured area to prevent unauthorized access. The potential direct contact pathway to soil greater than two feet is deemed incomplete based on Sunoco's existing permitting procedures which protect against exposure to soil encountered in excavations.
- There are no occupied buildings in AOI 10. The potential direct contact pathway to groundwater is deemed incomplete based on Sunoco's existing permitting procedures which prevent exposure to groundwater that may be encountered in excavations.
- Dissolved COCs in groundwater are not predicted to migrate beyond the AOI 10 boundary or trigger a condition in surface water that would exceed a water quality standard.
- COC concentrations above the ecological screening limits in sediment collected from Lands Creek are discussed in more detail Section 9.0.
- Lands Creek is surrounded by fencing and is within the limits of AOI 10. This fencing, in conjunction with Sunoco's permitting procedures which protect



against exposure during activities in the creek, eliminates the human health direct contact pathway to the creek sediments.

- The vapor intrusion screening evaluation using applicable soil and groundwater data indicated that no soil or groundwater analytical results in AOI 10 are above the non-residential EPA/PADEP default screening values or the OSHA PEL screening values;
- No soil gas sampling was completed as part of this site characterization, but if future development is proposed for the areas that were not able to be screened using the PADEP vapor screening criteria, soil gas sampling would be completed in these areas.

## **8.0 HUMAN HEALTH EXPOSURE ASSESSMENT/RISK ASSESSMENT**

Based on the current and future intended non-residential site use for AOI 10, an exposure assessment was conducted for all constituents that were above the non-residential statewide health standards in AOI 10. Potential human health exposures for the Refinery are for an industrial worker scenario. The media evaluated included groundwater, surface soil (less than two feet below grade), and subsurface soil (greater than two feet below grade). As described in Section 6.5, further evaluation of the vapor intrusion pathway is not required based on the lack of receptors and complete exposure pathways.

The potential direct contact pathway for soil (greater than two feet), groundwater and LNAPL under the industrial scenario is eliminated through Sunoco's established excavation procedures, PPE requirements and soil handling procedures described in Appendix K of the CCR. However, because direct contact to surface soils could occur outside of excavation activities, shallow soil samples were collected in non-paved areas of AOI 10 to assess this potential exposure pathway.

The following table serves as a summary of potential human health exposure pathways that can be reasonably expected under the current and intended future non-residential use for AOI 10. The table lists potentially contaminated media, potential receptors for these media, and a summary of whether any potentially-complete exposure pathways exist at AOI 10 from the media to these receptors.

## Exposure Pathway Evaluation Summary

| Contaminated Media | Residents | Workers           | Day Care | Construction      | Trespassers | Recreation | Food |
|--------------------|-----------|-------------------|----------|-------------------|-------------|------------|------|
| Groundwater        | NA        | No <sup>(1)</sup> | NA       | No <sup>(2)</sup> | No          | NA         | NA   |
| Air (indoor)       | NA        | No <sup>(3)</sup> | NA       | No <sup>(3)</sup> | No          | NA         | NA   |
| Soil <2 feet bgs.  | NA        | Yes               | NA       | Yes               | No          | NA         | NA   |
| Soil >2 feet bgs.  | NA        | No <sup>(4)</sup> | NA       | No <sup>(4)</sup> | No          | NA         | NA   |
| Surface Water      | NA        | No <sup>(5)</sup> | NA       | No <sup>(5)</sup> | NA          | NA         | NA   |
| Sediment           | No        | No <sup>(5)</sup> | NA       | No <sup>(5)</sup> | NA          | NA         | NA   |
| LNAPL              | NA        | No <sup>(1)</sup> | NA       | No <sup>(2)</sup> | NA          | NA         | NA   |

*Notes:*

- (1) No complete groundwater or LNAPL pathways exist for workers that are not addressed through on-site permitting procedures and PPE.
- (2) No complete groundwater or LNAPL pathway exists for construction workers that are not addressed through on-site permitting procedures and PPE.
- (3) No complete pathway to indoor air exists based on the evaluation described in Section 6.5.
- (4) No complete pathway exists for site soil >2 feet deep that are not addressed through on-site permitting procedures and PPE.
- (5) No complete pathway exists for surface water or sediment that are not addressed through on-site permitting procedures and PPE.

Na - Not applicable

No - No potential complete exposure pathway

Yes - Potential complete exposure pathway

A more detailed evaluation of each of these potential human health exposure pathways is presented in the following sections by media.

### 8.1 Surface Water/Sediment

Lands Creek is a surface water body located in AOI 10. Lands Creek is located within a fenced and secured area to prevent unauthorized access. Prior to any work being completed within AOI 10, appropriate work permits, safety and security measures must be approved by Sunoco Refinery personnel. These procedures protect against any potential exposures to surface water or sediments in Lands Creek.

### 8.2 Shallow Soils (0-2 Feet Below Grade)

#### 8.2.1 Direct Contact Exposure

In AOI 10, shallow soil samples were collected from within the CAMU and around the perimeter of the CAMU. To determine if any risk to the industrial worker exists due to direct contact, these samples were compared to the non-residential direct contact medium specific concentrations [PA Code Title 25, Chapter 250.305, Appendix A, Tables 3A and 4A]. Within the CAMU designated area, concentrations of benzo(a)pyrene and dibenzo(a,h)anthracene were

detected above their respective direct contact MSCs. Outside the CAMU designated area, concentrations of arsenic, benzo(a)pyrene, and lead were detected above their respective direct contact MSCs. In accordance with Section IV of the PADEP's Technical Guidance Manual, site-specific standards for the above-mentioned constituents were calculated using PADEP default intake parameters for an onsite worker and a risk level of  $10^{-4}$  (Tables H-1 through H-5 in Appendix H). For calculating a site-specific standard for on-site workers exposed to lead, Sunoco used the Society of Environmental Geochemistry and Health (SEGH) model used by PADEP to develop the non-residential soil MSCs.

The calculated site-specific standards are summarized in the table below:

| Compound                                  | Calculated Site-Specific Standard (mg/kg) |
|-------------------------------------------|-------------------------------------------|
| Arsenic [non-carcinogenic / carcinogenic] | 8,520/529*                                |
| Benzo(a)pyrene                            | 109                                       |
| Dibenzo(a,h)anthracene                    | 109                                       |
| Lead                                      | 1,708                                     |

*\*Note: Arsenic has both carcinogenic and non-carcinogenic toxicological effects; therefore, both criteria were calculated. For characterization, the lower, more stringent standard was used to screen the analytical data.*

The site-specific screening levels for arsenic, benzo(a)pyrene, and dibenzo(a,h)anthracene were calculated for ingestion based on the calculations specified in 25 Pa. Code § 250.306(b). These calculations used the PADEP's default parameters and an updated target risk level of  $1E-4$ , in consideration of the site-specific conditions (PADEP's default target risk level is  $1E-5$ ).

The site-specific screening level for lead was also calculated for ingestion. As presented in 25 Pa. Code § 250.306(e), Appendix A, Table 7, the non-residential soil screening value for lead is based on the method presented in the report 'The Society for Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil' (Wixson, 1991). The model used by the PADEP and developed by SEGH was also used to calculate the site-specific criterion for the refinery. Based on the SEGH model and PADEP's default parameters, PADEP's non-residential direct contact MSC default value

for lead in surface soil is 1,000 mg/kg. To develop a site-specific criteria for lead, some of the parameters used by the PADEP were updated in consideration of site-specific conditions and updated lead data collected from recent studies. As presented in Appendix H, based on the revised parameters, the derived site-specific standard for lead in soil is 1,708 mg/kg for a refinery worker.

Shallow soil sample results for arsenic, benzo(a)pyrene, dibenzo(a,h)anthracene and lead were compared to the calculated site-specific standards. None of the reported results for arsenic or dibenzo(a,h)anthracene were detected above the site-specific standards; however, the results for benzo(a)pyrene and lead were detected above the site-specific standard in seven samples (one sample for benzo(a)pyrene and six samples for lead). In addition to comparing the individual results to the site-specific standards, the cumulative risk of exposure to arsenic, benzo(a)pyrene, and dibenzo(a,h)anthracene in shallow soil throughout AOI 10 was also calculated (Table H-6). Based on the PADEP's TGM, the total cumulative risk for exposure to carcinogenic compounds should not exceed 1E-4 and the cumulative hazard index for exposure to non-carcinogenic compounds should not exceed 1. Lead exposure is dependent on the blood/lead concentration and not risk based; therefore, lead could not be incorporated into the cumulative risk calculation.

As presented in Table H-6:

- The total cumulative hazard index for exposure to the non-carcinogenic compound [arsenic] is less than the PADEP's requirement of 1.0; and
- The total cumulative risk for exposure to carcinogens is 3.65E-04, greater than the acceptable risk of 1.0E-04.

### **8.3 Groundwater**

Results of the groundwater sampling indicated COCs at concentrations above their respective non-residential groundwater MSCs, including benzene, chrysene, naphthalene, and lead. Concentrations of these COCs are not predicted to migrate beyond the boundaries of AOI 10 or trigger a condition in surface water that would exceed a water quality standard.

Excavations in AOI 10 are governed by Sunoco's permitting procedures which protect against potential exposures to groundwater that could be encountered in an excavation. Previous investigations and well searches verified that no monitoring wells located within 1.5 miles of the refinery are used for drinking water or agricultural use.

#### **8.4 LNAPL**

There are no complete direct contact exposure pathways for LNAPL within AOI 10 because of on-site permitting procedures and required PPE.

#### **8.5 Vapor**

There are no buildings in AOI 10. The results of the screening evaluation using the PADEP's vapor intrusion guidance indicate, in the areas where the guidance can be applied, no soil or groundwater analytical results exceed the non-residential EPA/PADEP OSHA PEL screening values. No soil gas sampling was completed as part of this site characterization, but if future development is proposed for the areas that were not able to be screened using the PADEP vapor screening criteria, soil gas sampling would be completed in these areas.

### **9.0 ECOLOGICAL ASSESSMENT**

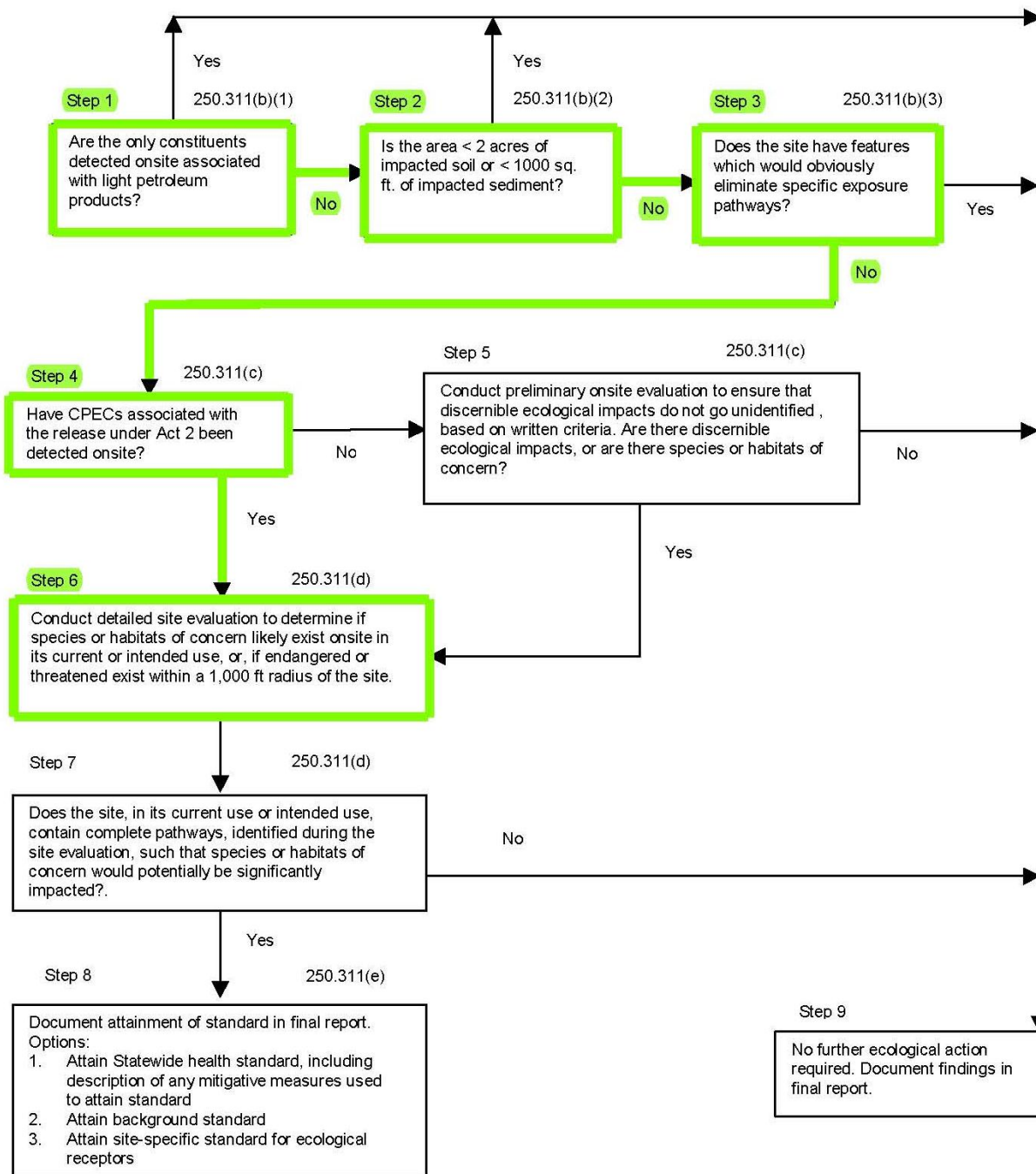
The majority of AOI 10 is covered with soil and gravel. The soil and gravel-covered portions of AOI 10 are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. An inquiry to identify potential endangered, threatened and special concern wildlife was made by submitting a request to the Pennsylvania Natural Diversity Inventory (PNDI) data base. The PNDI search identified two potential impacts that require further review. The first potential impact was for an endangered species identified by the PA Game Commission as the Great Egret. The second is a potential conflict of an unidentified threatened species listed by the PA Fish and Boat Commission.

Lands Creek is a surface water body located within AOI 10 and is identified as a blue line stream on the USGS topographic map (Figure 1). The creek is designated a warm water fishes stream by PA. A fence is located around the perimeter of the creek preventing access to the creek from outside the Sunoco property. A Langan representative completed an on-site

evaluation of the creek area in April 2011 and identified true sediment exists within the creek. No stressed vegetation was observed. The surface water area of the creek is greater than 1,000 square feet and is not a permitted open water management area. The creek is a freshwater, tidally-influenced drainage feature that is separated from the Schuylkill River by an earthen mound.

Five surface water samples were collected from Lands Creek and analyzed for COCs listed in Table 1c. The results indicate that no COCs were above the 25 Pa. Code Chapter 93 screening criteria for ecological receptors. Five sediment samples were also collected and analyzed for COCs listed in Table 1d. The results of the samples are discussed in Section 4.5.

To further evaluate the ecological conditions relating to Lands Creek, an ecological screening assessment was performed in accordance with Act 2 Technical Guidance Manual (TGM). On the following page is the ecological screening flow chart from the TGM. The AOI-10 decision path is highlighted in green.



Based on the ecological screening evaluation, additional work needs to be completed to determine if the threatened and endangered species listed in PNDI receipt, or suitable habitat for these species, exist within a 1,000 foot radius of the site.

## **10.0 COMMUNITY RELATION ACTIVITIES**

A Community Relation Plan (CRP) that includes public involvement with local residents to inform them of the anticipated investigations and remediation activities was completed as part of the NIR submittal in 2006. The purpose of this CRP is to provide a mechanism for the community, government officials, and other interested or affected citizens to be informed of on-site activities related to the investigation activities at the Site. This plan incorporates aspects of public involvement under both PADEP's Act 2 program and EPA's RCRA Corrective Action program. This report and future Act 2 reports will include the appropriate municipal and public notices in accordance with the provisions of Act 2. Notices will be published in the Pennsylvania Bulletin and a summary of the notice will appear in a local newspaper. As part of the CRP, Sunoco intends to hold annual public meetings in the City of Philadelphia give status updates of the project.

EPA will complete its own public involvement through notices under the Corrective Action Program and by updating its online Fact Sheet for the refinery. A copy of the NIR and the Act 2 report notifications for this SCR/RIR are included in Appendix B.

## **11.0 CONCLUSIONS AND RECOMMENDATIONS**

Based on the results of the completed activities, the following conclusions and recommendations have been developed for AOI 10:

### **SOIL**

#### **Shallow Soil**

- Shallow soil sample results for arsenic, benzo(a)pyrene, dibenzo(a,h)anthracene and lead were compared to the calculated site-specific standards. None of the reported results for arsenic or dibenzo(a,h)anthracene were detected above the site-specific standards.
- A concentration of benzo(a)pyrene was detected above the site-specific standard in one sample location (BH-10-64). Sunoco will delineate the area where benzo(a)pyrene exceeds the calculated site-specific standard at BH-10-64. Following delineation, Sunoco will consider remedial options to address this area. Remedial options will be presented in the Cleanup Plan for AOI 10.



- Concentrations of lead were detected above its calculated site-specific standard at six sample locations (BH-10-51, BH-10-53, BH-10-57, BH-10-62, BH-10-73, and BH-10-76). Sunoco will delineate the areas where lead exceeds the calculated site-specific standard. Following delineation, Sunoco will consider remedial options to address these areas. Remedial options will be presented in the Cleanup Plan for AOI 10.
- The total cumulative hazard index for exposure to the non-carcinogenic compound [arsenic] is less than the PADEP's requirement of 1.0.
- The total cumulative risk for exposure to carcinogens is 3.65E-04, greater than the acceptable risk of 1.0E-04. The cumulative risk for exposure to carcinogens will be re-evaluated after addressing the areas with lead and benzo(a)pyrene above the calculated site-specific values.

#### Soil Greater Than 2 Feet Below Grade

- The direct contact pathway to soil greater than 2 feet beneath the ground surface at the refinery is incomplete because of on-site procedures and PPE requirements that protect onsite workers from exposure.

#### **CAMU Area**

- Several COCs were detected above the MSCs in the waste material and in the soil beneath the waste material. However, only low concentrations of benzene, chrysene, naphthalene and lead were detected in groundwater beneath or around the CAMU areas. Therefore, the constituents in the waste materials above the MSCs do not appear to have a significant impact on groundwater quality beneath and around the CAMU areas. Therefore; Sunoco is requesting that EPA issue a comfort letter for the CAMU in AOI 10 regarding the characterization work completed.

#### **GROUNDWATER**

- Fate and transport calculations were completed for groundwater in AOI 10 to evaluate potential migration pathways/potential impacts to receptors. Eight wells (W-1, W-12, W-23, W-28, W-31, W-32, W-33, and W-34) in AOI 10 exhibited concentrations of groundwater COCs above their respective MSCs. The results from these wells were modeled using the QD model to determine whether COC concentrations could potentially reach the AOI 10 boundary. The modeling results indicate concentrations above the groundwater MSCs in shallow wells W-1, W-12, W-23, W-28, W-31, W-32,

and W-34 are not predicted to migrate beyond the AOI 10 boundary, with the exception of one well, W-33, which contains a concentration of benzene that has the potential to reach Lands Creek. However, the predicted benzene concentration at the Lands Creek boundary is below the 25 Pa. Code Chapter 93 surface water quality criteria for benzene.

- Excavations in AOI 10 are governed by Sunoco's permitting procedures which protect against potential exposures to groundwater that could be encountered in an excavation.

### **SOIL VAPOR**

- There are no occupied buildings in AOI 10.
- The results of the vapor intrusion screening evaluation using the PADEP guidance and the soil data collected (where the groundwater table is greater than five feet) indicate that no soil analytical results in AOI 10 are above the non-residential EPA/PADEP default screening values or the OSHA PEL screening values.
- No soil gas sampling was completed as part of this site characterization, but if future development is proposed for the areas that were not able to be screened using the PADEP vapor screening criteria, soil gas sampling would be completed in these areas.

### **LNAPL**

- LNAPL occurrence in AOI 10 is limited to wells W-8, W-14 and W-18 and is immobile.
- There is poor correlation between areas with LNAPL and dissolved COCs in groundwater nearby.
- There are no complete direct contact exposure pathways for LNAPL within AOI 10 because of on-site permitting procedures and required PPE.

### **SURFACE WATER**

- No COCs were detected in the surface water samples collected from Lands Creek at concentrations above their respective 25 Pa. Code Chapter 93 screening criteria.

### **SEDIMENT**

- Based on the ecological screening evaluation, additional work needs to be completed to determine if the threatened and endangered species listed in PNDI receipt, or suitable habitat for these species, exist within a 1,000 foot radius of the site. This work will be completed in support of, and documented in, the Cleanup Plan for AOI 10.

## 12.0 SCHEDULE

The proposed schedule for future Site activities is:

- Submittal of a Cleanup Plan within 6 to 12 months following PADEP approval of the SCR/RIR;
- Submittal of an Act 2 Cleanup Plan and Final Report; and
- Continue quarterly monitoring activities and reports.

## 13.0 SIGNATURES

The following parties are participating in the remediation at this time and are seeking relief from liability under Act 2 of 1995:

A handwritten signature in black ink, appearing to read 'James Oppenheim', is written over a horizontal line.

James Oppenheim  
Sunoco Inc. (R&M)

This Act 2 RIR has been prepared in accordance with the final provisions of Act 2 and the June 8, 2002 Land Recycling Program Technical Guidance Manual.

## 14.0 REFERENCES

*Groundwater Resources of the Coastal Plain Area of Southeastern Pennsylvania. Greenman, Topographic and Geologic Survey, Bulletin W-13, 375 pp., David W., Rima, Donald R., Lockwood, William N. and Meisler, Harold. 1961.*

*Simulation of Ground-Water Flow in the Lower Sand Unit of the Potomac-Raritan-Magothy Aquifer System, Philadelphia, Pennsylvania, U.S. Geological Survey, Water-Resources Investigations Report 86-4055, Sloto, R. A., 1988.*

*RCRA Facility Investigation Work Plan, Philadelphia Refinery, Sun Refining and Marketing Company, Philadelphia Pennsylvania, CHM2HILL, May 1991.*

*Phase I Preliminary Review of SWMUs, Sun Company, Inc., Philadelphia Refinery, A.T. Kearney Inc., January 1986.*

*RCRA Facility Assessment RFA, Sun Company Inc., Philadelphia Refinery, A.T. Kearney Inc., August 1986.*

*RCRA Facility Investigation Work Plan, Sun Company, Inc., Philadelphia Refinery, PA, CHM2Hill, May 1991.*

*Results of RCRA Facility Investigation (RFI), Sun Company, Inc., Philadelphia, PA, ENSR Consulting and Engineering, September 30, 1992.*

*Comprehensive Remedial Plan Sunoco Appendices Volume 1, January 1993.*

*Investigation of Shallow and Deep Groundwater Quality, Philadelphia Refinery, PA, ENSR Consulting and Engineering, May 1994.*

*Semi-Annual Groundwater Gauging Event (July-December 1994), Sunoco Philadelphia Refinery, Philadelphia, PA, GES, January 30, 1995.*

*Corrective Measures Study Work Plan, Sun Company, Inc., Philadelphia Refinery, PA, ENSR Consulting and Engineering, Volume I, April 1997.*

*Current Conditions Report and Comprehensive Remedial Plan*, Sunoco Inc., Philadelphia, PA, prepared by Langan Engineering and Environmental Services June 30, 2004.

*West Yard Release Soil Sampling Summary Letter Report*, Philadelphia Refinery, Philadelphia, PA, Stantec, Inc., July 7, 2010.

## TABLES

**Table 1a**  
**Constituents of Concern for Groundwater**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>METALS</b>    | <b>CAS No.</b> |
|------------------|----------------|
| Lead (dissolved) | 7439-92-1      |

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane                | 107-06-2       |
| 1,2,4-Trimethylbenzene            | 95-63-6        |
| 1,3,5-Trimethylbenzene            | 108-67-8       |
| Benzene                           | 71-43-2        |
| Cumene                            | 98-82-8        |
| Ethylbenzene                      | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether       | 1634-04-4      |
| Toluene                           | 108-88-3       |
| Xylenes (total)                   | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.
2. Select groundwater samples to be collected within the CAMU were analyzed for full TCL VOCs, TCL SVOCs, and TAL metals.

**Table 1b**  
**Constituents of Concern for Soil**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>METALS</b> | <b>CAS No.</b> |
|---------------|----------------|
| Lead (total)  | 7439-92-1      |

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane                | 107-06-2       |
| 1,2,4-Trimethylbenzene            | 95-63-6        |
| 1,3,5-Trimethylbenzene            | 108-67-8       |
| Benzene                           | 71-43-2        |
| Cumene                            | 98-82-8        |
| Ethylbenzene                      | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether       | 1634-04-4      |
| Toluene                           | 108-88-3       |
| Xylenes (total)                   | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Anthracene                             | 120-12-7       |
| Benzo(a)anthracene                     | 56-55-3        |
| Benzo (g,h,i) perylene                 | 191-24-2       |
| Benzo(a)pyrene                         | 50-32-8        |
| Benzo(b)fluoranthene                   | 205-99-2       |
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.
2. Select soil samples collected within and around the CAMU were analyzed for full TCL VOCs, TCL SVOCs, and TAL metals.



**Table 1c**  
**Constituents of Concern for Surface Water**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane                | 107-06-2       |
| 1,2,4-Trimethylbenzene            | 95-63-6        |
| 1,3,5-Trimethylbenzene            | 108-67-8       |
| Benzene                           | 71-43-2        |
| Cumene                            | 98-82-8        |
| Ethylbenzene                      | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether       | 1634-04-4      |
| Toluene                           | 108-88-3       |
| Xylenes (total)                   | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

| <b>TOTAL AND DISSOLVED TAL METALS</b> | <b>CAS No.</b> |
|---------------------------------------|----------------|
| Aluminum                              | 7429-90-5      |
| Antimony                              | 7440-36-0      |
| Arsenic                               | 7440-38-2      |
| Barium                                | 7440-39-3      |
| Beryllium                             | 7440-41-7      |
| Cadmium                               | 7440-43-9      |
| Calcium                               | 7440-70-2      |
| Chromium                              | 7440-47-3      |
| Cobalt                                | 7440-48-4      |
| Copper                                | 7440-50-8      |
| Iron                                  | 7439-89-6      |
| Lead (total)                          | 7439-92-1      |
| Magnesium                             | 7439-95-4      |
| Manganese                             | 7439-96-5      |
| Mercury                               | 7439-97-6      |
| Nickel                                | 7440-02-0      |
| Potassium                             | 9777440        |
| Selenium                              | 7782-49-2      |
| Silver                                | 7440-22-4      |
| Sodium                                | 7440-23-5      |
| Thallium                              | 7440-28-0      |
| Vanadium                              | 7440-62-2      |
| Zinc                                  | 7440-66-6      |
| <b>Additional Analysis</b>            |                |
| Hardness                              |                |

**Table 1d**  
**Constituents of Concern for Sediment Samples**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>VOLATILE ORGANIC COMPOUNDS</b>                   | <b>CAS No.</b> |
|-----------------------------------------------------|----------------|
| 1,2-Dichloroethane                                  | 107-06-2       |
| 1,2,4-Trimethylbenzene                              | 95-63-6        |
| 1,3,5-Trimethylbenzene                              | 108-67-8       |
| Benzene                                             | 71-43-2        |
| Cumene                                              | 98-82-8        |
| Ethylbenzene                                        | 100-41-4       |
| Ethylene dibromide                                  | 106-93-4       |
| Methyl tertiary butyl ether                         | 1634-04-4      |
| Toluene                                             | 108-88-3       |
| Xylenes (total)                                     | 1330-20-7      |
| <b>Additional Volatile Compounds To Be Analyzed</b> |                |
| 1,2-Dichlorobenzene                                 | 95-50-1        |
| 1,3-Dichlorobenzene                                 | 541-73-1       |
| 1,4-Dichlorobenzene                                 | 106-46-7       |
| 1-Methylnaphthalene                                 | 90-12-0        |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS (via SIMS Method)</b> | <b>CAS No.</b> |
|----------------------------------------------------------|----------------|
| Anthracene                                               | 120-12-7       |
| Benzo(a)anthracene                                       | 56-55-3        |
| Benzo (g,h,i) perylene                                   | 191-24-2       |
| Benzo(a)pyrene                                           | 50-32-8        |
| Benzo(b)fluoranthene                                     | 205-99-2       |
| Chrysene                                                 | 218-01-9       |
| Fluorene                                                 | 86-73-7        |
| Naphthalene                                              | 91-20-3        |
| Phenanthrene                                             | 85-01-8        |
| Pyrene                                                   | 129-00-0       |
| <b>Additional Semi-Volatile Compounds To Be Analyzed</b> |                |
| Phenol                                                   | 108-95-2       |
| 2,4-Dimethylphenol                                       | 105-67-9       |
| 2,4-Dinitrophenol                                        | 51-28-5        |
| 2-Methylphenol                                           | 95-48-7        |
| 6-Methyl Chrysene                                        | 1705-85-7      |
| 2-Nitrophenol                                            | 88-75-5        |
| Benzenethiol                                             | 108-98-5       |
| Dibenz(a,h)acridine                                      | 224-53-3       |
| Benzo(k)fluoranthene                                     | 207-08-9       |
| Benzyl Butyl Phthalate                                   | 85-68-7        |
| bis(2-Ethylhexyl) phthalate                              | 117-81-7       |
| Dibenzo(a,h)anthracene                                   | 53-70-3        |
| Diethyl Phthalate                                        | 84-66-2        |
| Dimethyl Phthalate                                       | 131-11-3       |
| Di-n-butyl phthalate                                     | 84-74-2        |
| Di-n-octyl phthalate                                     | 117-84-0       |
| Fluoranthene                                             | 206-44-0       |

Notes:

1. Additional compounds to be analyzed obtained from a modified analyte list from the 1992 RCRA RFI.

**Table 1d (continued)**  
**Constituents of Concern for Sediment Samples**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>TAL METALS</b>          | <b>CAS No.</b> |
|----------------------------|----------------|
| Aluminum                   | 7429-90-5      |
| Antimony                   | 7440-36-0      |
| Arsenic                    | 7440-38-2      |
| Barium                     | 7440-39-3      |
| Beryllium                  | 7440-41-7      |
| Cadmium                    | 7440-43-9      |
| Calcium                    | 7440-70-2      |
| Chromium                   | 7440-47-3      |
| Cobalt                     | 7440-48-4      |
| Copper                     | 7440-50-8      |
| Iron                       | 7439-89-6      |
| Lead (total)               | 7439-92-1      |
| Magnesium                  | 7439-95-4      |
| Manganese                  | 7439-96-5      |
| Mercury                    | 7439-97-6      |
| Nickel                     | 7440-02-0      |
| Potassium                  | 9/7/7440       |
| Selenium                   | 7782-49-2      |
| Silver                     | 7440-22-4      |
| Sodium                     | 7440-23-5      |
| Thallium                   | 7440-28-0      |
| Vanadium                   | 7440-62-2      |
| Zinc                       | 7440-66-6      |
| <b>Additional Analysis</b> |                |
| Total Organic Carbon       |                |
| Particle Grain Size        |                |

Notes:

1. Additional compounds to be analyzed obtained from a modified analyte list from the 1992 RCRA RFI.

Table 2  
Existing Well Summary  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Well ID           | Former Well ID <sup>1</sup> | Northing   | Easting     | Well Type       | Well Classification <sup>2</sup> | Soil Boring Log Available (Y/N) | Construction Detail Available (Y/N) | Date of Well Completion | Well Construction Details <sup>3</sup> |                    |                                                               |                                         |                                       |                                          |                           |                     | References      |
|-------------------|-----------------------------|------------|-------------|-----------------|----------------------------------|---------------------------------|-------------------------------------|-------------------------|----------------------------------------|--------------------|---------------------------------------------------------------|-----------------------------------------|---------------------------------------|------------------------------------------|---------------------------|---------------------|-----------------|
|                   |                             |            |             |                 |                                  |                                 |                                     |                         | Well Completion Depth (ft. bgs)        | Well Diameter (in) | Top of Inner Casing Elevation <sup>4</sup> (ft. msl) (NAVD88) | Ground Surface Elevation (ft.) (NAVD88) | Top of Screen Elevation (ft) (NAVD88) | Bottom of Screen Elevation (ft) (NAVD88) | Depth to Screen (ft. bgs) | Screen Length (ft.) |                 |
| W-1               | W-17                        | 223593.677 | 2682761.638 | Monitoring Well | Shallow                          | Y                               | Y                                   | 8/9/88                  | 17                                     | 2                  | 9.60                                                          | 7.69                                    | 5.69                                  | -9.31                                    | 2                         | 15                  |                 |
| W-1D              |                             | 223583.998 | 2682756.483 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 4/6/11                  | 76.5                                   | 4                  | 10.73                                                         | 7.87                                    | -58.63                                | -68.63                                   | 66.5                      | 10                  | Aquaterra, 2011 |
| W-2               | W-16                        | 223350.051 | 2681822.333 | Monitoring Well | Shallow                          | Y                               | N                                   | 8/7/85                  | 21.5                                   | –                  | 19.45                                                         | 17.27                                   | –                                     | –                                        | –                         | –                   | Sun, 1993       |
| W-3 <sup>5</sup>  | W-1                         | 222926.249 | 2682400.535 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 14.6                                   | –                  | 9.47                                                          | –                                       | –                                     | –                                        | 2                         | 8                   | Sun, 1993       |
| W-4 <sup>5</sup>  | W-2                         | 223120.547 | 2682104.698 | Monitoring Well | Shallow                          | Y                               | Y                                   | 6/21/85                 | 10                                     | –                  | 6.51                                                          | –                                       | –                                     | –                                        | 2                         | 8                   | Sun, 1993       |
| W-5               | MW-12, B-12                 | 223047.410 | 2681651.163 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/19/92                 | 13                                     | 4                  | 7.73                                                          | 6.00                                    | 3.00                                  | -7.00                                    | 3                         | 10                  | ENSR, 1992      |
| W-6               | W-5                         | 222623.498 | 2682398.660 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 10                                     | –                  | 7.49                                                          | 4.83                                    | 2.83                                  | -5.17                                    | 2                         | 8                   | Sun, 1993       |
| W-7 <sup>5</sup>  | W-4                         | 222671.404 | 2681958.304 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/55                 | 10                                     | –                  | 8.55                                                          | –                                       | –                                     | –                                        | 2                         | 8                   | Sun, 1993       |
| W-8               | MW-14, B-14                 | 222548.523 | 2681883.523 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/24/92                 | 13                                     | 4                  | 8.44                                                          | 7.22                                    | 4.22                                  | -5.78                                    | 3                         | 10                  | ENSR, 1992      |
| W-9               | MW-20, B-20                 | 222542.814 | 2681893.171 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 3/12/92                 | 79                                     | 2                  | 9.29                                                          | 6.96                                    | 4.96                                  | -3.04                                    | 2                         | 8                   | ENSR, 1992      |
| W-10              | W-8                         | 222348.449 | 2681974.151 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/24/85                 | 10                                     | –                  | 7.72                                                          | 4.74                                    | 2.74                                  | -5.27                                    | 2                         | 8                   | Sun, 1993       |
| W-11              | W-7                         | 222285.800 | 2682276.399 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 10                                     | –                  | 8.06                                                          | 5.80                                    | 5.80                                  | -4.20                                    | 0                         | 10                  | Sun, 1993       |
| W-12              | MW-16, B-16                 | 221939.059 | 2682078.235 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/25/92                 | 13                                     | 4                  | 7.10                                                          | 5.08                                    | 2.08                                  | -4.92                                    | 3                         | 7                   | ENSR, 1992      |
| W-13              | MW-21, B-21                 | 221929.280 | 2682064.602 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 3/12/92                 | 74                                     | 4                  | 6.65                                                          | 5.16                                    | -51.84                                | -61.84                                   | 57                        | 10                  | ENSR, 1992      |
| W-14              | MW-13, B-13                 | 222310.042 | 2681746.563 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/19/92                 | 10                                     | 4                  | 7.26                                                          | 5.44                                    | 2.44                                  | -4.56                                    | 3                         | 7                   | ENSR, 1992      |
| W-15              | W-6                         | 222774.758 | 2681623.753 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 10                                     | –                  | 8.78                                                          | 7.30                                    | 7.30                                  | -2.70                                    | 0                         | 10                  | Sun, 1993       |
| W-16              | MW-15, B-15                 | 221794.793 | 2681794.482 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/24/92                 | 12                                     | 4                  | 6.64                                                          | 5.50                                    | 2.50                                  | -4.50                                    | 3                         | 7                   | ENSR, 1992      |
| W-17              | W-10                        | 221776.820 | 2681731.049 | Monitoring Well | Shallow                          | Y                               | N                                   | 8/9/88                  | 10                                     | 2                  | 7.22                                                          | 5.07                                    | 3.07                                  | -4.93                                    | 2                         | 8                   | Sun, 1993       |
| W-18              | W-12                        | 221944.014 | 2681223.198 | Monitoring Well | Shallow                          | Y                               | N                                   | 8/10/88                 | 15                                     | 2                  | 8.12                                                          | 5.92                                    | 4.92                                  | -9.08                                    | 1                         | 14                  | Sun, 1993       |
| W-19              | MW-27, B-27                 | 222405.114 | 2680982.432 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 3/25/92                 | 83                                     | 2                  | 10.06                                                         | 8.17                                    | -61.83                                | -71.83                                   | 70                        | 10                  | ENSR, 1992      |
| W-20              | MW-17, B-17                 | 222415.212 | 2680986.732 | Monitoring Well | Shallow                          | Y                               | Y                                   | 2/25/92                 | 12                                     | 4                  | 10.11                                                         | 8.84                                    | 5.84                                  | -1.16                                    | 3                         | 7                   | ENSR, 1992      |
| W-21 <sup>5</sup> | W-13                        | 222238.813 | 2680879.938 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 10                                     | –                  | 7.64                                                          | –                                       | –                                     | –                                        | 2                         | 8                   | Sun, 1993       |
| W-22              | W-14                        | 222466.056 | 2680429.390 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 8                                      | 2                  | 6.44                                                          | 6.00                                    | 6.00                                  | -2.00                                    | 0                         | 8                   | Sun, 1993       |
| W-23              | W-15                        | 222588.626 | 2680081.211 | Monitoring Well | Shallow                          | Y                               | N                                   | 6/21/85                 | 10                                     | 2                  | 7.55                                                          | 5.21                                    | -4.79                                 | -14.79                                   | 10                        | 10                  | Sun, 1993       |
| W-24              | W-18                        | 222584.494 | 2679927.148 | Monitoring Well | Shallow                          | Y                               | Y                                   | 8/10/88                 | 15                                     | 2                  | 5.47                                                          | 3.73                                    | 2.73                                  | -11.27                                   | 1                         | 14                  | Sun, 1993       |
| W-25              | MW-18, B-18                 | 222643.035 | 2679601.016 | Monitoring Well | Shallow                          | Y                               | Y                                   | 3/2/92                  | 17                                     | 4                  | 10.15                                                         | 8.03                                    | 3.03                                  | -6.97                                    | 5                         | 10                  | ENSR, 1992      |
| W-26              | MW-19, B-19                 | 222651.426 | 2679591.709 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 3/4/92                  | 37                                     | 4                  | 9.98                                                          | 8.35                                    | -9.65                                 | -14.65                                   | 18                        | 5                   | ENSR, 1992      |
| W-27              | W-19                        | 222625.973 | 2679107.331 | Monitoring Well | Shallow                          | Y                               | Y                                   | 8/10/88                 | 20                                     | 2                  | 10.86                                                         | 9.17                                    | 4.17                                  | -10.83                                   | 5                         | 15                  | Sun, 1993       |
| W-28              |                             | 222857.370 | 2682420.037 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/18/11                 | 14                                     | 4                  | 8.61                                                          | 5.79                                    | 1.79                                  | -8.21                                    | 4                         | 10                  | Aquaterra, 2011 |
| W-29              |                             | 223225.260 | 2682148.792 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/18/11                 | 14                                     | 4                  | 11.82                                                         | 9.09                                    | 5.09                                  | -4.91                                    | 4                         | 10                  | Aquaterra, 2011 |
| W-30              |                             | 222660.796 | 2681982.993 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/15/11                 | 13                                     | 4                  | 8.65                                                          | 6.58                                    | 3.58                                  | -6.42                                    | 3                         | 10                  | Aquaterra, 2011 |
| W-31              |                             | 222012.680 | 2681807.660 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/15/11                 | 15                                     | 4                  | 8.27                                                          | 5.43                                    | 2.43                                  | -9.57                                    | 3                         | 12                  | Aquaterra, 2011 |
| W-32              |                             | 222061.938 | 2681224.314 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/18/11                 | 13                                     | 4                  | 14.83                                                         | 11.96                                   | 8.96                                  | -1.04                                    | 3                         | 10                  | Aquaterra, 2011 |
| W-32D             |                             | 222055.387 | 2681222.072 | Monitoring Well | Intermediate                     | Y                               | Y                                   | 4/8/11                  | 53                                     | 4                  | 14.70                                                         | 11.50                                   | -31.50                                | -84.50                                   | 43                        | 53                  | Aquaterra, 2011 |
| W-33              |                             | 222385.134 | 2680145.426 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/20/11                 | 16                                     | 4                  | 17.07                                                         | 13.36                                   | 7.36                                  | -2.64                                    | 6                         | 10                  | Aquaterra, 2011 |
| W-34              |                             | 222425.094 | 2680918.947 | Monitoring Well | Shallow                          | Y                               | Y                                   | 4/20/11                 | 15                                     | 4                  | 14.14                                                         | 10.78                                   | 6.78                                  | -3.22                                    | 4                         | 10                  | Aquaterra, 2011 |
| PH-31             | –                           | –          | –           | Abandoned       | –                                | –                               | –                                   | –                       | –                                      | –                  | –                                                             | –                                       | –                                     | –                                        | –                         | –                   | USGS, 1989      |

NOTES:

– Data could not be located or determined based on available reports  
Abandoned/destroyed wells.

AOI - Area of Interest

ft. - feet

bgs - below ground surface

in. - inches

msl - elevation relative to mean sea level

NA - Data not available

1. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.

2. Well classification based on the formation that the well is screened in. Wells screened within the Middle Clay or the Farrington Sand are classified as deep wells.

Well classification for wells screened above the Lower/Middle Clay are based on the following: screened in Fill/Alluvium - Shallow, screened in Trenton Gravel - Intermediate, screened in Fill/Alluvium & Trenton Gravel - Shallow/Intermediate

3. Well construction details were taken directly from well boring logs provided by Handex, Stantec, Aquaterra or collected from available historic reports.

4. Wells were surveyed by Langan in July 2010 and May 2011.

5. Wells could not be located.

6. Well is damaged.

Table 3  
Summary of Groundwater and LNAPL Elevations  
May 2011  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Monitoring Point ID | Northing   | Easting     | Well Type       | Well Classification <sup>1</sup> | Specific Gravity (g/cc) Used for GW Correction |                     | Well Completion Depth (ft bgs) | Depth to Product (ft btic) | Depth to GW <sup>4</sup> (ft btic) | Apparent LNAPL Thickness (ft) | LNAPL Elevation (ft amsl) | GW Elevation (ft amsl) | Corrected GW Elevation (ft amsl) | TIC Elevation (ft amsl) | Notes                               |
|---------------------|------------|-------------|-----------------|----------------------------------|------------------------------------------------|---------------------|--------------------------------|----------------------------|------------------------------------|-------------------------------|---------------------------|------------------------|----------------------------------|-------------------------|-------------------------------------|
|                     |            |             |                 |                                  | S.G. <sup>2</sup>                              | Source <sup>3</sup> |                                |                            |                                    |                               |                           |                        |                                  |                         |                                     |
| W-1                 | 223593.677 | 2682761.638 | Monitoring Well | Shallow                          |                                                |                     | 17.0                           | -                          | 6.21                               | -                             | -                         | 3.39                   | 3.39                             | 9.60                    |                                     |
| W-1D                | 223583.998 | 2682756.483 | Monitoring Well | Intermediate                     |                                                |                     | 76.5                           | -                          | 9.19                               | -                             | -                         | 1.54                   | 1.54                             | 10.73                   |                                     |
| W-2                 | 223350.051 | 2681822.333 | Monitoring Well | Shallow                          |                                                |                     | 21.5                           | -                          | 15.16                              | -                             | -                         | 4.29                   | 4.29                             | 19.45                   |                                     |
| W-5                 | 223047.410 | 2681651.163 | Monitoring Well | Shallow                          |                                                |                     | 13.0                           | -                          | 3.11                               | -                             | -                         | 4.62                   | 4.62                             | 7.73                    |                                     |
| W-6                 | 222623.498 | 2682398.660 | Monitoring Well | Shallow                          |                                                |                     | 10.0                           | -                          | 2.52                               | -                             | -                         | 4.97                   | 4.97                             | 7.49                    |                                     |
| W-8                 | 222548.523 | 2681883.523 | Monitoring Well | Shallow                          | 0.9515                                         | W-8                 | 13.0                           | . <sup>5</sup>             | -                                  | 0.59                          | NA                        | NA                     | NA                               | 8.44                    | Product sample collected on 4/27/11 |
| W-9                 | 222542.814 | 2681893.171 | Monitoring Well | Intermediate                     |                                                |                     | 79.0                           | -                          | 9.39                               | -                             | -                         | -0.10                  | -0.10                            | 9.29                    |                                     |
| W-11                | 222285.800 | 2682276.399 | Monitoring Well | Shallow                          |                                                |                     | 10.0                           | -                          | 3.69                               | -                             | -                         | 4.37                   | 4.37                             | 8.06                    |                                     |
| W-12                | 221939.059 | 2682078.235 | Monitoring Well | Shallow                          |                                                |                     | 13.0                           | -                          | 2.97                               | -                             | -                         | 4.13                   | 4.13                             | 7.10                    |                                     |
| W-13                | 221929.280 | 2682064.602 | Monitoring Well | Intermediate                     |                                                |                     | 74.0                           | -                          | 7.57                               | -                             | -                         | -0.92                  | -0.92                            | 6.65                    |                                     |
| W-14                | 222310.042 | 2681746.563 | Monitoring Well | Shallow                          | 0.9478                                         | W-14                | 10.0                           | 2.01                       | 2.12                               | 0.11                          | 5.25                      | 5.14                   | 5.25                             | 7.26                    | Product sample collected on 4/27/11 |
| W-15                | 222774.758 | 2681623.753 | Monitoring Well | Shallow                          |                                                |                     | 10.0                           | -                          | 2.15                               | -                             | -                         | 6.63                   | 6.63                             | 8.78                    |                                     |
| W-16                | 221794.793 | 2681794.482 | Monitoring Well | Shallow                          |                                                |                     | 12.0                           | -                          | 2.42                               | -                             | -                         | 4.22                   | 4.22                             | 6.64                    |                                     |
| W-17                | 221776.820 | 2681731.049 | Monitoring Well | Shallow                          |                                                |                     | 10.0                           | -                          | 2.89                               | -                             | -                         | 4.33                   | 4.33                             | 7.22                    |                                     |
| W-18                | 221944.014 | 2681223.198 | Monitoring Well | Shallow                          | 0.9478                                         | W-14                | 15.0                           | . <sup>5</sup>             | -                                  | 0.01                          | NA                        | NA                     | NA                               | 8.12                    | Product sample collected on 4/27/11 |
| W-19                | 222405.114 | 2680982.432 | Monitoring Well | Intermediate                     |                                                |                     | 83.0                           | -                          | 10.87                              | -                             | -                         | -0.81                  | -0.81                            | 10.06                   |                                     |
| W-20                | 222415.212 | 2680986.732 | Monitoring Well | Shallow                          |                                                |                     | 12.0                           | -                          | 4.75                               | -                             | -                         | 5.36                   | 5.36                             | 10.11                   |                                     |
| W-22                | 222466.056 | 2680429.390 | Monitoring Well | Shallow                          |                                                |                     | 8.0                            | -                          | 0.99                               | -                             | -                         | 5.45                   | 5.45                             | 6.44                    |                                     |
| W-23                | 222588.626 | 2680081.211 | Monitoring Well | Shallow                          |                                                |                     | 10.0                           | -                          | 2.10                               | -                             | -                         | 5.45                   | 5.45                             | 7.55                    |                                     |
| W-25                | 222643.035 | 2679601.016 | Monitoring Well | Shallow                          |                                                |                     | 17.0                           | -                          | 5.71                               | -                             | -                         | 4.44                   | 4.44                             | 10.15                   |                                     |
| W-26                | 222651.426 | 2679591.709 | Monitoring Well | Intermediate                     |                                                |                     | 37.0                           | -                          | 11.68                              | -                             | -                         | -1.70                  | -1.70                            | 9.98                    |                                     |
| W-27                | 222625.973 | 2679107.331 | Monitoring Well | Shallow                          |                                                |                     | 20.0                           | -                          | 6.18                               | -                             | -                         | 4.68                   | 4.68                             | 10.86                   |                                     |
| W-28                | 222857.370 | 2682420.037 | Monitoring Well | Shallow                          |                                                |                     | 14.0                           | -                          | 3.22                               | -                             | -                         | 5.39                   | 5.39                             | 8.61                    |                                     |
| W-29                | 223225.260 | 2682148.792 | Monitoring Well | Shallow                          |                                                |                     | 14.0                           | -                          | 7.36                               | -                             | -                         | 4.46                   | 4.46                             | 11.82                   |                                     |
| W-30                | 222660.796 | 2681982.993 | Monitoring Well | Shallow                          |                                                |                     | 13.0                           | -                          | 3.40                               | -                             | -                         | 5.25                   | 5.25                             | 8.65                    |                                     |
| W-31                | 222012.680 | 2681807.660 | Monitoring Well | Shallow                          |                                                |                     | 15.0                           | -                          | 3.13                               | -                             | -                         | 5.14                   | 5.14                             | 8.27                    |                                     |
| W-32                | 222061.938 | 2681224.314 | Monitoring Well | Shallow                          |                                                |                     | 13.0                           | -                          | 9.09                               | -                             | -                         | 5.74                   | 5.74                             | 14.83                   |                                     |
| W-32D               | 222055.387 | 2681222.072 | Monitoring Well | Intermediate                     |                                                |                     | 53.0                           | -                          | 11.43                              | -                             | -                         | 3.27                   | 3.27                             | 14.70                   |                                     |
| W-33                | 222385.134 | 2680145.426 | Monitoring Well | Shallow                          |                                                |                     | 16.0                           | -                          | 11.35                              | -                             | -                         | 5.72                   | 5.72                             | 17.07                   |                                     |
| W-34                | 222425.094 | 2680918.947 | Monitoring Well | Shallow                          |                                                |                     | 15.0                           | -                          | 8.27                               | -                             | -                         | 5.87                   | 5.87                             | 14.14                   |                                     |

Notes:  
1. Well type was chosen based on the formation the well screens. Wells screened within the Middle Clay or the Farrington Sand were classified as deep wells. Based on their total depth, wells screened above the Middle Clay are classified as either a shallow and/or intermediate well.  
2. Specific Gravity (S.G.) values were determined from LNAPL samples collected by Aquaterra/Stantek as part of CCR and/or SCR/RIR.  
3. For wells with no direct LNAPL density measurements, the density value in the nearest well with LNAPL data was used.  
4. Depth to water and depth to LNAPL provided by Aquaterra. All wells gauged on 4/26 & 4/27/11 unless otherwise noted.  
5. LNAPL thickness values obtained from June 2010 gauging event. Product in well was too viscous to collect accurate product thickness in April 2011.  
g/cc = grams per cubic centimeter  
LNAPL = Light Non-Aqueous Phase Liquid  
ft amsl = Feet Above Mean Sea Level  
GW = Groundwater  
NA = Not Applicable  
NM = Not Measured  
NP = No Product  
ft btic = Feet Below Top of Inner Casing

Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-36      |    |        |      | BH-10-37      |    |        |      | BH-10-38      |    |        |      | BH-10-39      |    |        |       | BH-10-40      |    |        |      |  |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|-------|---------------|----|--------|------|--|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-36 0-2' |    |        |      | BH-10-37 0-2' |    |        |      | BH-10-38 0-2' |    |        |      | BH-10-39 0-2' |    |        |       | BH-10-40 0-2' |    |        |      |  |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/5/2011      |    |        |      | 4/5/2011      |    |        |      | 4/5/2011      |    |        |      | 4/5/2011      |    |        |       | 4/5/2011      |    |        |      |  |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |       | Soil          |    |        |      |  |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |       | 0-2 ft bgs    |    |        |      |  |
| Unit                                   | Result    | Q                                                                              | RL                                                                              | DF                                                  | Result                                                               | Q               | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q     | RL            | DF |        |      |  |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |       |               |    |        |      |  |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | 0.4           | J  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | ND            | U  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | ND            | U  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | ND            | U  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.008         |    | 0.0006 | 0.91 | 0.008         |    | 0.0006 | 0.93 | ND            | U  | 9E-04  | 1.52 | 0.12          | J  | 0.08   | 121.6 | 0.003         | J  | 0.0005 | 0.79 |  |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | 0.18          | J  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | 0.24          | J  | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U  | 0.001  | 0.91 | ND            | U  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | 2.5           |    | 0.16   | 121.6 | ND            | U  | 0.0009 | 0.79 |  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND            | U  | 0.0006 | 0.91 | ND            | U  | 0.0006 | 0.93 | ND            | U  | 9E-04  | 1.52 | ND            | U  | 0.08   | 121.6 | ND            | U  | 0.0005 | 0.79 |  |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.009         |    | 0.001  | 0.91 | 0.005         | J  | 0.001  | 0.93 | ND            | U  | 0.002  | 1.52 | ND            | U  | 0.16   | 121.6 | 0.001         | J  | 0.0009 | 0.79 |  |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |       |               |    |        |      |  |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | 0.46          | J  | 0.2    | 5    | 1.9           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 12            |    | 2.2    | 5     | 4.7           |    | 0.19   | 5    |  |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 1.8           |    | 0.2    | 5    | 6.5           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 22            |    | 2.2    | 5     | 11            |    | 0.19   | 5    |  |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 1.8           |    | 0.2    | 5    | 6.5           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 16            |    | 2.2    | 5     | 9.2           |    | 0.19   | 5    |  |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 2.4           |    | 0.2    | 5    | 9.3           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 25            |    | 2.2    | 5     | 12            |    | 0.19   | 5    |  |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 1.3           |    | 0.2    | 5    | 3.9           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 9.9           | J  | 2.2    | 5     | 4.8           |    | 0.19   | 5    |  |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 2.2           |    | 0.2    | 5    | 6.2           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 23            |    | 2.2    | 5     | 10            |    | 0.19   | 5    |  |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND            | U  | 0.2    | 5    | 0.83          | J  | 0.21   | 5    | ND            | U  | 0.2    | 5    | 7             | J  | 2.2    | 5     | 1.3           |    | 0.19   | 5    |  |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | 0.39          | J  | 0.2    | 5    | 1.1           |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | ND            | U  | 2.2    | 5     | 0.51          | J  | 0.19   | 5    |  |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 1.9           |    | 0.2    | 5    | 8.6           |    | 0.21   | 5    | 0.24          | J  | 0.2    | 5    | 50            |    | 2.2    | 5     | 18            |    | 0.19   | 5    |  |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | 3.1           |    | 0.2    | 5    | 10            |    | 0.21   | 5    | ND            | U  | 0.2    | 5    | 51            |    | 2.2    | 5     | 20            |    | 0.19   | 5    |  |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |       |               |    |        |      |  |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 390           |    | 0.0627 | 10   | 540           |    | 0.132  | 20   | 11.6          |    | 0.012  | 2    | 415           |    | 0.068  | 10    | 65.1          |    | 0.0121 | 2    |  |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |       |               |    |        |      |  |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 18.7          |    | 0.5    | 1    | 21.8          |    | 0.5    | 1    | 16.9          |    | 0.5    | 1    | 23.9          |    | 0.5    | 1     | 15            |    | 0.5    | 1    |  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-41      |   |       |      | BH-10-42      |   |       |     | BH-10-47      |   |       |      | BH-10-49      |   |       |      | BH-10-50      |   |       |     |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|-------|------|---------------|---|-------|-----|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|-----|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-41_0-2' |   |       |      | BH-10-42_0-2' |   |       |     | BH-10-47_0-2' |   |       |      | BH-10-49_0-2' |   |       |      | BH-10-50_0-2' |   |       |     |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/5/2011      |   |       |      | 4/19/2011     |   |       |     | 4/19/2011     |   |       |      | 4/19/2011     |   |       |      | 4/19/2011     |   |       |     |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |       |      | Soil          |   |       |     | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |     |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |     | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |     |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL    | DF   | Result        | Q | RL    | DF  | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF  |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |     |               |   |       |      |               |   |       |      |               |   |       |     |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | 0.014         |   | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | 0.007         | J | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.008         | J | 8E-04 | 1.05 | 0.002         | J | 7E-04 | 1.1 | 0.003         | J | 5E-04 | 0.82 | 0.007         |   | 7E-04 | 0.93 | 0.003         | J | 5E-04 | 0.8 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.012         |   | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | 0.002         | J | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | ND            | U | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U | 0.002 | 1.05 | ND            | U | 0.001 | 1.1 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.93 | ND            | U | 9E-04 | 0.8 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND            | U | 8E-04 | 1.05 | ND            | U | 7E-04 | 1.1 | ND            | U | 5E-04 | 0.82 | ND            | U | 7E-04 | 0.93 | ND            | U | 5E-04 | 0.8 |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.01          |   | 0.002 | 1.05 | 0.001         | J | 0.001 | 1.1 | 0.002         | J | 0.001 | 0.82 | 0.003         | J | 0.001 | 0.93 | 0.001         | J | 9E-04 | 0.8 |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |     |               |   |       |      |               |   |       |      |               |   |       |     |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND            | U | 1.2   | 5    | 1.2           |   | 0.2   | 1   | 0.25          |   | 0.04  | 1    | 0.057         | J | 0.047 | 1    | 1.4           |   | 0.037 | 1   |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 1.2   | 5    | 1.4           |   | 0.2   | 1   | 0.67          |   | 0.04  | 1    | 0.12          | J | 0.047 | 1    | 1.9           |   | 0.037 | 1   |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | ND            | U | 1.2   | 5    | 1.3           |   | 0.2   | 1   | 0.82          |   | 0.04  | 1    | 0.14          | J | 0.047 | 1    | 1.3           |   | 0.037 | 1   |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 1.2   | 5    | 1.5           |   | 0.2   | 1   | 0.83          |   | 0.04  | 1    | 0.094         | J | 0.047 | 1    | 1.5           |   | 0.037 | 1   |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | ND            | U | 1.2   | 5    | 2.2           |   | 0.2   | 1   | 0.77          |   | 0.04  | 1    | 0.15          | J | 0.047 | 1    | 0.78          |   | 0.037 | 1   |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | ND            | U | 1.2   | 5    | 2.6           |   | 0.2   | 1   | 0.73          |   | 0.04  | 1    | 0.18          | J | 0.047 | 1    | 1.7           |   | 0.037 | 1   |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND            | U | 1.2   | 5    | 0.32          | J | 0.2   | 1   | 0.05          | J | 0.04  | 1    | ND            | U | 0.047 | 1    | 0.64          |   | 0.037 | 1   |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | ND            | U | 1.2   | 5    | 2.8           |   | 0.2   | 1   | 0.29          |   | 0.04  | 1    | 0.11          | J | 0.047 | 1    | 0.74          |   | 0.037 | 1   |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | ND            | U | 1.2   | 5    | 2.9           |   | 0.2   | 1   | 0.54          |   | 0.04  | 1    | 0.15          | J | 0.047 | 1    | 4.7           |   | 0.37  | 10  |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | ND            | U | 1.2   | 5    | 2.5           |   | 0.2   | 1   | 0.81          |   | 0.04  | 1    | 0.14          | J | 0.047 | 1    | 3.3           |   | 0.037 | 1   |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |     |               |   |       |      |               |   |       |      |               |   |       |     |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 186           |   | 0.039 | 5    | 249           |   | 0.06  | 10  | 233           |   | 0.062 | 10   | 340           |   | 0.072 | 10   | 84.7          |   | 0.029 | 5   |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |     |               |   |       |      |               |   |       |      |               |   |       |     |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 34            |   | 0.5   | 1    | 15.3          |   | 0.5   | 1   | 17.1          |   | 0.5   | 1    | 29.5          |   | 0.5   | 1    | 11.8          |   | 0.5   | 1   |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard



Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-53      |   |       |      | BH-10-54      |   |       |      | BH-10-59      |   |       |      | BH-10-60      |   |       |      | BH-10-61      |   |       |     |        |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|-----|--------|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-53_0-2' |   |       |      | BH-10-54_0-2' |   |       |      | BH-10-59_0-2' |   |       |      | BH-10-60_0-2' |   |       |      | BH-10-61_0-2' |   |       |     |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/22/2011     |   |       |      | 4/22/2011     |   |       |      | 4/22/2011     |   |       |      | 4/22/2011     |   |       |      | 4/22/2011     |   |       |     |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |     |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |     |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF  | Result |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |        |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | 0.002         | J | 0.001 | 0.98 | 0.005         | J | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.98 | ND            | U | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.98 | ND            | U | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.98 | 0.004         | J | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.018         |   | 9E-04 | 0.98 | 0.005         | J | 5E-04 | 0.82 | 0.012         |   | 6E-04 | 0.98 | 0.02          |   | 8E-04 | 1.26 | 0.002         | J | 5E-04 | 0.8 |        |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.002         | J | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | 0.003         | J | 0.001 | 0.98 | 0.005         | J | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.98 | ND            | U | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U | 0.002 | 0.98 | ND            | U | 0.001 | 0.82 | ND            | U | 0.001 | 0.98 | ND            | U | 0.002 | 1.26 | ND            | U | 0.001 | 0.8 |        |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND            | U | 9E-04 | 0.98 | ND            | U | 5E-04 | 0.82 | ND            | U | 6E-04 | 0.98 | ND            | U | 8E-04 | 1.26 | ND            | U | 5E-04 | 0.8 |        |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.01          |   | 0.002 | 0.98 | 0.007         |   | 0.001 | 0.82 | 0.006         |   | 0.001 | 0.98 | 0.011         |   | 0.002 | 1.26 | 0.001         | J | 0.001 | 0.8 |        |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |        |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | 0.28          | J | 0.063 | 1    | 0.83          |   | 0.041 | 1    | 1.3           | J | 0.41  | 10   | ND            | U | 4     | 10   | 0.29          |   | 0.04  | 1   |        |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.53          |   | 0.063 | 1    | 2.4           |   | 0.041 | 1    | 2.1           |   | 0.41  | 10   | ND            | U | 4     | 10   | 0.65          |   | 0.04  | 1   |        |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 0.39          |   | 0.063 | 1    | 2.5           |   | 0.041 | 1    | 1.6           | J | 0.41  | 10   | 10            | J | 4     | 10   | 0.58          |   | 0.04  | 1   |        |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.48          |   | 0.063 | 1    | 3.2           |   | 0.041 | 1    | 2.1           |   | 0.41  | 10   | 4.9           | J | 4     | 10   | 0.7           |   | 0.04  | 1   |        |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 0.2           | J | 0.063 | 1    | 1.7           |   | 0.041 | 1    | 1.2           | J | 0.41  | 10   | 11            | J | 4     | 10   | 0.34          |   | 0.04  | 1   |        |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 0.47          |   | 0.063 | 1    | 2.6           |   | 0.041 | 1    | 2.3           |   | 0.41  | 10   | 9.7           | J | 4     | 10   | 0.57          |   | 0.04  | 1   |        |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | 0.12          | J | 0.063 | 1    | 0.21          |   | 0.041 | 1    | 0.73          | J | 0.41  | 10   | ND            | U | 4     | 10   | 0.047         | J | 0.04  | 1   |        |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | 0.088         | J | 0.063 | 1    | 0.87          |   | 0.041 | 1    | ND            | U | 0.41  | 10   | ND            | U | 4     | 10   | 0.067         | J | 0.04  | 1   |        |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 0.9           |   | 0.063 | 1    | 2.8           |   | 0.041 | 1    | 4.1           |   | 0.41  | 10   | ND            | U | 4     | 10   | 1.1           |   | 0.04  | 1   |        |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | 0.86          |   | 0.063 | 1    | 4.4           |   | 0.041 | 1    | 3.9           |   | 0.41  | 10   | 7.1           | J | 4     | 10   | 1             |   | 0.04  | 1   |        |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |        |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 3310          |   | 0.491 | 50   | 186           |   | 0.033 | 5    | 401           |   | 0.061 | 10   | 777           |   | 0.122 | 20   | 118           |   | 0.03  | 5   |        |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |        |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 48.1          |   | 0.5   | 1    | 20            |   | 0.5   | 1    | 18.3          |   | 0.5   | 1    | 17.3          |   | 0.5   | 1    | 17.3          |   | 0.5   | 1   |        |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard



Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-62      |   |       |      | BH-10-66      |   |       |      | BH-10-67      |   |       |      | BH-10-71      |   |       |      | BH-10-72      |   |       |       |        |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|-------|--------|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-62_0-2' |   |       |      | BH-10-66_0-2' |   |       |      | BH-10-67_0-2' |   |       |      | BH-10-71_0-2' |   |       |      | BH-10-72_0-2' |   |       |       |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/22/2011     |   |       |      | 4/21/2011     |   |       |      | 4/21/2011     |   |       |      | 4/5/2011      |   |       |      | 4/5/2011      |   |       |       |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |       |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |       |        |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF    | Result |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |       |        |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | 0.004         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.16          |   | 0.002 | 1.08 | 0.011         |   | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | ND            | U | 0.002 | 1.08 | ND            | U | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.003         | J | 0.002 | 1.08 | ND            | U | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | 0.002         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.029         |   | 0.002 | 1.08 | 0.005         | J | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.051         |   | 0.001 | 1.07 | 0.004         | J | 5E-04 | 0.79 | 0.11          |   | 0.001 | 1.08 | 0.019         |   | 6E-04 | 0.95 | ND            | U | 0.062 | 79.72 |        |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.006         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.3           |   | 0.002 | 1.08 | 0.016         |   | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.023         |   | 0.002 | 1.08 | 0.002         | J | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.79 | 0.005         | J | 0.002 | 1.08 | ND            | U | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND            | U | 0.001 | 1.07 | ND            | U | 5E-04 | 0.79 | ND            | U | 0.001 | 1.08 | ND            | U | 6E-04 | 0.95 | ND            | U | 0.062 | 79.72 |        |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.024         |   | 0.002 | 1.07 | 0.002         | J | 0.001 | 0.79 | 0.22          |   | 0.002 | 1.08 | 0.014         |   | 0.001 | 0.95 | ND            | U | 0.12  | 79.72 |        |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |       |        |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | 0.73          | J | 0.62  | 10   | ND            | U | 0.04  | 1    | 0.33          |   | 0.062 | 1    | ND            | U | 0.21  | 5    | 5.8           | J | 2.6   | 5     |        |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 1.6           | J | 0.62  | 10   | 0.07          | J | 0.04  | 1    | 0.62          |   | 0.062 | 1    | 0.32          | J | 0.21  | 5    | 15            |   | 2.6   | 5     |        |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 2.4           | J | 0.62  | 10   | 0.065         | J | 0.04  | 1    | 0.57          |   | 0.062 | 1    | 0.51          | J | 0.21  | 5    | 49            |   | 2.6   | 5     |        |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 2.8           | J | 0.62  | 10   | 0.069         | J | 0.04  | 1    | 0.7           |   | 0.062 | 1    | 0.35          | J | 0.21  | 5    | 31            |   | 2.6   | 5     |        |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 3.4           |   | 0.62  | 10   | 0.085         | J | 0.04  | 1    | 0.39          |   | 0.062 | 1    | 1.1           |   | 0.21  | 5    | 47            |   | 2.6   | 5     |        |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 1.8           | J | 0.62  | 10   | 0.077         | J | 0.04  | 1    | 0.75          |   | 0.062 | 1    | 0.46          | J | 0.21  | 5    | 27            |   | 2.6   | 5     |        |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND            | U | 0.62  | 10   | ND            | U | 0.04  | 1    | 0.12          | J | 0.062 | 1    | ND            | U | 0.21  | 5    | ND            | U | 2.6   | 5     |        |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | 4.2           |   | 0.62  | 10   | ND            | U | 0.04  | 1    | 0.28          | J | 0.062 | 1    | 0.25          | J | 0.21  | 5    | 3.1           | J | 2.6   | 5     |        |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 1.9           | J | 0.62  | 10   | 0.06          | J | 0.04  | 1    | 1.1           |   | 0.062 | 1    | 0.47          | J | 0.21  | 5    | 12            | J | 2.6   | 5     |        |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | 2.6           | J | 0.62  | 10   | 0.079         | J | 0.04  | 1    | 1.2           |   | 0.062 | 1    | 0.68          | J | 0.21  | 5    | 49            |   | 2.6   | 5     |        |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |       |        |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 2580          |   | 0.475 | 50   | 250           |   | 0.031 | 5    | 985           |   | 0.192 | 20   | 244           |   | 0.065 | 10   | 946           |   | 0.159 | 20    |        |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |       |        |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 46.3          |   | 0.5   | 1    | 18            |   | 0.5   | 1    | 46.8          |   | 0.5   | 1    | 20.2          |   | 0.5   | 1    | 35.7          |   | 0.5   | 1     |        |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-73      |   |       |      | BH-10-76      |   |       |      | BH-10-78      |   |       |      | BH-10-79      |   |       |     | BH-10-80      |   |       |      |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|------|---------------|---|-------|-----|---------------|---|-------|------|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-73_0-2' |   |       |      | BH-10-76_0-2' |   |       |      | BH-10-78_0-2' |   |       |      | BH-10-79_0-2' |   |       |     | BH-10-80_0-2' |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/5/2011      |   |       |      | 4/20/2011     |   |       |      | 4/21/2011     |   |       |      | 4/21/2011     |   |       |     | 4/21/2011     |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |      | Soil          |   |       |     | Soil          |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |     | 0-2 ft bgs    |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF  | Result        | Q | RL    | DF   |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |               |   |       |      |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | 0.005         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | 0.003         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.016         |   | 9E-04 | 1.07 | 0.005         | J | 5E-04 | 0.89 | 0.001         | J | 5E-04 | 0.82 | 0.004         | J | 5E-04 | 0.8 | 0.009         |   | 5E-04 | 0.81 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.012         |   | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | 0.003         | J | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U | 0.002 | 1.07 | ND            | U | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | ND            | U | 9E-04 | 0.8 | ND            | U | 0.001 | 0.81 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND            | U | 9E-04 | 1.07 | ND            | U | 5E-04 | 0.89 | ND            | U | 5E-04 | 0.82 | ND            | U | 5E-04 | 0.8 | ND            | U | 5E-04 | 0.81 |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.018         |   | 0.002 | 1.07 | 0.002         | J | 0.001 | 0.89 | ND            | U | 0.001 | 0.82 | 0.001         | J | 9E-04 | 0.8 | 0.001         | J | 0.001 | 0.81 |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |               |   |       |      |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND            | U | 2.9   | 5    | 0.26          |   | 0.04  | 1    | 0.43          |   | 0.039 | 1    | ND            | U | 0.038 | 1   | 0.57          |   | 0.04  | 1    |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 2.9   | 5    | 1.4           |   | 0.04  | 1    | 0.91          |   | 0.039 | 1    | 0.041         | J | 0.038 | 1   | 1.7           |   | 0.04  | 1    |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | ND            | U | 2.9   | 5    | 1.8           |   | 0.04  | 1    | 0.66          |   | 0.039 | 1    | 0.046         | J | 0.038 | 1   | 1.4           |   | 0.04  | 1    |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 2.9   | 5    | 1.5           |   | 0.04  | 1    | 0.81          |   | 0.039 | 1    | 0.046         | J | 0.038 | 1   | 1.9           |   | 0.04  | 1    |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 3.9           | J | 2.9   | 5    | 2             |   | 0.04  | 1    | 0.33          |   | 0.039 | 1    | ND            | U | 0.038 | 1   | 0.79          |   | 0.04  | 1    |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | ND            | U | 2.9   | 5    | 1.6           |   | 0.04  | 1    | 0.82          |   | 0.039 | 1    | ND            | U | 0.038 | 1   | 1.6           |   | 0.04  | 1    |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND            | U | 2.9   | 5    | 0.083         | J | 0.04  | 1    | 0.14          | J | 0.039 | 1    | ND            | U | 0.038 | 1   | 0.15          | J | 0.04  | 1    |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | 17            |   | 2.9   | 5    | 0.34          |   | 0.04  | 1    | 0.085         | J | 0.039 | 1    | ND            | U | 0.038 | 1   | 0.18          | J | 0.04  | 1    |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 4.4           | J | 2.9   | 5    | 0.74          |   | 0.04  | 1    | 1.3           |   | 0.039 | 1    | ND            | U | 0.038 | 1   | 1.9           |   | 0.04  | 1    |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | ND            | U | 2.9   | 5    | 0.99          |   | 0.04  | 1    | 1.3           |   | 0.039 | 1    | 0.042         | J | 0.038 | 1   | 2.9           |   | 0.04  | 1    |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |               |   |       |      |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 4550          |   | 0.887 | 100  | 1990          |   | 0.621 | 100  | 79.3          |   | 0.012 | 2    | 145           |   | 0.029 | 5   | 234           |   | 0.06  | 10   |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |       |      |               |   |       |      |               |   |       |      |               |   |       |     |               |   |       |      |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 42.5          |   | 0.5   | 1    | 17.1          |   | 0.5   | 1    | 15.3          |   | 0.5   | 1    | 12.6          |   | 0.5   | 1   | 16.5          |   | 0.5   | 1    |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | W-1D       |    |        |     | W-28       |    |        |       | W-29       |    |        |      | W-30       |    |        |      | W-31       |    |       |       |
|----------------------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|------------|----|--------|-----|------------|----|--------|-------|------------|----|--------|------|------------|----|--------|------|------------|----|-------|-------|
|                                        |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample ID       | W-1D 0-2'  |    |        |     | W-28 0-2'  |    |        |       | W-29 0-2'  |    |        |      | W-30@0'-2' |    |        |      | W-31@0'-2' |    |       |       |
|                                        |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Date     | 4/5/2011   |    |        |     | 4/19/2011  |    |        |       | 4/19/2011  |    |        |      | 4/15/2011  |    |        |      | 4/15/2011  |    |       |       |
|                                        |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Matrix   | Soil       |    |        |     | Soil       |    |        |       | Soil       |    |        |      | Soil       |    |        |      | Soil       |    |       |       |
|                                        |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Interval | 0-2 ft bgs |    |        |     | 0-2 ft bgs |    |        |       | 0-2 ft bgs |    |        |      | 0-2 ft bgs |    |        |      | 0-2 ft bgs |    |       |       |
| Unit                                   | Result    | Q                                                                                       | RL                                                                                       | DF                                                        | Result                                                                           | Q               | RL         | DF | Result | Q   | RL         | DF | Result | Q     | RL         | DF | Result | Q    | RL         | DF | Result | Q    | RL         | DF |       |       |
| Volatile Organic Compounds             |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |            |    |        |     |            |    |        |       |            |    |        |      |            |    |        |      |            |    |       |       |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                                     | 35                                                                                       | 560                                                       | 35                                                                               | mg/kg           | ND         | U  | 9E-04  | 0.8 | 1.6        |    | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | 0.004      | J  | 0.003  | 1.45 | 0.092      | J  | 0.075 | 63.87 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                                   | 0.0012                                                                                   | 3.7                                                       | 0.005                                                                            | mg/kg           | ND         | U  | 9E-04  | 0.8 | ND         | U  | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | ND         | U  | 0.003  | 1.45 | ND         | U  | 0.075 | 63.87 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                                     | 0.1                                                                                      | 86                                                        | 0.5                                                                              | mg/kg           | ND         | U  | 9E-04  | 0.8 | ND         | U  | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | ND         | U  | 0.003  | 1.45 | ND         | U  | 0.075 | 63.87 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                                     | 9.3                                                                                      | 480                                                       | 9.3                                                                              | mg/kg           | ND         | U  | 9E-04  | 0.8 | 0.43       |    | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | 0.003      | J  | 0.003  | 1.45 | 0.086      | J  | 0.075 | 63.87 |
| Benzene                                | 71-43-2   | 0.5                                                                                     | 0.13                                                                                     | 290                                                       | 0.5                                                                              | mg/kg           | 0.001      | J  | 5E-04  | 0.8 | 0.17       | J  | 0.03   | 50.09 | 0.004      | J  | 5E-04  | 0.95 | 0.012      | J  | 0.001  | 1.45 | 0.089      | J  | 0.037 | 63.87 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                                    | 990                                                                                      | 8000                                                      | 1000                                                                             | mg/kg           | ND         | U  | 9E-04  | 0.8 | 0.54       |    | 0.06   | 50.09 | 0.001      | J  | 0.001  | 0.95 | ND         | U  | 0.003  | 1.45 | 0.14       | J  | 0.075 | 63.87 |
| Ethylbenzene                           | 100-41-4  | 70                                                                                      | 46                                                                                       | 10000                                                     | 70                                                                               | mg/kg           | ND         | U  | 9E-04  | 0.8 | 0.065      | J  | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | ND         | U  | 0.003  | 1.45 | 0.076      | J  | 0.075 | 63.87 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                                     | 2500                                                                                     | 10000                                                     | 2500                                                                             | mg/kg           | ND         | U  | 9E-04  | 0.8 | ND         | U  | 0.06   | 50.09 | ND         | U  | 0.001  | 0.95 | ND         | U  | 0.003  | 1.45 | 0.4        |    | 0.075 | 63.87 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                                       | 0.28                                                                                     | 3200                                                      | 2                                                                                | mg/kg           | ND         | U  | 5E-04  | 0.8 | ND         | U  | 0.03   | 50.09 | ND         | U  | 5E-04  | 0.95 | ND         | U  | 0.001  | 1.45 | ND         | U  | 0.037 | 63.87 |
| Toluene                                | 108-88-3  | 100                                                                                     | 44                                                                                       | 10000                                                     | 100                                                                              | mg/kg           | ND         | U  | 9E-04  | 0.8 | 0.11       | J  | 0.06   | 50.09 | 0.006      |    | 0.001  | 0.95 | 0.004      | J  | 0.003  | 1.45 | 0.094      | J  | 0.075 | 63.87 |
| Semi-Volatile Organic Compounds        |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |            |    |        |     |            |    |        |       |            |    |        |      |            |    |        |      |            |    |       |       |
| Anthracene                             | 120-12-7  | 6.6                                                                                     | 350                                                                                      | 190000                                                    | 350                                                                              | mg/kg           | 2.3        |    | 0.19   | 5   | 0.57       |    | 0.04   | 1     | 0.83       |    | 0.038  | 1    | ND         | U  | 0.057  | 1    | 0.49       | J  | 0.39  | 10    |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                                    | 320                                                                                      | 110                                                       | 110                                                                              | mg/kg           | 3.7        |    | 0.19   | 5   | 0.63       |    | 0.04   | 1     | 0.9        |    | 0.038  | 1    | 0.07       | J  | 0.057  | 1    | 0.78       | J  | 0.39  | 10    |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                                    | 46                                                                                       | 11                                                        | 11                                                                               | mg/kg           | 2.7        |    | 0.19   | 5   | 0.39       |    | 0.04   | 1     | 0.84       |    | 0.038  | 1    | ND         | U  | 0.057  | 1    | 0.59       | J  | 0.39  | 10    |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                                    | 170                                                                                      | 110                                                       | 110                                                                              | mg/kg           | 3.7        |    | 0.19   | 5   | 0.27       |    | 0.04   | 1     | 0.97       |    | 0.038  | 1    | ND         | U  | 0.057  | 1    | 0.54       | J  | 0.39  | 10    |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                                   | 180                                                                                      | 170000                                                    | 180                                                                              | mg/kg           | 1.4        |    | 0.19   | 5   | 0.22       |    | 0.04   | 1     | 0.76       |    | 0.038  | 1    | ND         | U  | 0.057  | 1    | ND         | U  | 0.39  | 10    |
| Chrysene                               | 218-01-9  | 0.19                                                                                    | 230                                                                                      | 11000                                                     | 230                                                                              | mg/kg           | 3.2        |    | 0.19   | 5   | 1.4        |    | 0.04   | 1     | 1.1        |    | 0.038  | 1    | 0.4        |    | 0.057  | 1    | 2.6        |    | 0.39  | 10    |
| Fluorene                               | 86-73-7   | 190                                                                                     | 3800                                                                                     | 110000                                                    | 3800                                                                             | mg/kg           | 1          |    | 0.19   | 5   | 0.97       |    | 0.04   | 1     | 0.14       | J  | 0.038  | 1    | ND         | U  | 0.057  | 1    | ND         | U  | 0.39  | 10    |
| Naphthalene                            | 91-20-3   | 10                                                                                      | 25                                                                                       | 56000                                                     | 25                                                                               | mg/kg           | 0.42       | J  | 0.19   | 5   | 0.67       |    | 0.04   | 1     | 1.3        |    | 0.038  | 1    | 0.11       | J  | 0.057  | 1    | ND         | U  | 0.39  | 10    |
| Phenanthrene                           | 85-01-8   | 110                                                                                     | 10000                                                                                    | 190000                                                    | 10000                                                                            | mg/kg           | 7.9        |    | 0.19   | 5   | 1.9        |    | 0.04   | 1     | 1.4        |    | 0.038  | 1    | 0.35       |    | 0.057  | 1    | 0.51       | J  | 0.39  | 10    |
| Pyrene                                 | 129-00-0  | 13                                                                                      | 2200                                                                                     | 84000                                                     | 2200                                                                             | mg/kg           | 6.9        |    | 0.19   | 5   | 1.4        |    | 0.04   | 1     | 1.5        |    | 0.038  | 1    | 0.28       | J  | 0.057  | 1    | 2.2        |    | 0.39  | 10    |
| Metals                                 |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |            |    |        |     |            |    |        |       |            |    |        |      |            |    |        |      |            |    |       |       |
| Lead                                   | 7439-92-1 | 0.5                                                                                     | 450                                                                                      | 1000                                                      | 450                                                                              | mg/kg           | 76.5       |    | 0.012  | 2   | 181        |    | 0.03   | 5     | 259        |    | 0.058  | 10   | 1990       |    | 0.431  | 50   | 955        |    | 0.152 | 25    |
| General Chemistry                      |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |            |    |        |     |            |    |        |       |            |    |        |      |            |    |        |      |            |    |       |       |
| Moisture, Percent                      | MOIST     | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | %               | 13.6       |    | 0.5    | 1   | 17         |    | 0.5    | 1     | 13.9       |    | 0.5    | 1    | 42         |    | 0.5    | 1    | 14.6       |    | 0.5   | 1     |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 4  
Summary of Shallow Soil Sample Analytical Results: Outside CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | W-32D      |    |        |      | W-33       |    |       |      | W-34       |   |       |      |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|------------|----|--------|------|------------|----|-------|------|------------|---|-------|------|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | W-32D 0-2' |    |        |      | W-33 0-2'  |    |       |      | W-34 0-2'  |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/7/2011   |    |        |      | 4/20/2011  |    |       |      | 4/20/2011  |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil       |    |        |      | Soil       |    |       |      | Soil       |   |       |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs |    |        |      | 0-2 ft bgs |    |       |      | 0-2 ft bgs |   |       |      |
| Unit                                   | Result    | Q                                                                              | RL                                                                              | DF                                                  | Result                                                               | Q               | RL         | DF | Result | Q    | RL         | DF |       |      |            |   |       |      |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |            |    |        |      |            |    |       |      |            |   |       |      |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.003      | J  | 7E-04  | 1.01 | 0.011      |    | 5E-04 | 0.87 | 0.003      | J | 5E-04 | 0.89 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | ND         | U  | 0.001  | 1.01 | 0.006      |    | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND         | U  | 0.001  | 1.01 | ND         | U  | 0.001 | 0.87 | ND         | U | 0.001 | 0.89 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND         | U  | 7E-04  | 1.01 | ND         | U  | 5E-04 | 0.87 | ND         | U | 5E-04 | 0.89 |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.002      | J  | 0.001  | 1.01 | 0.011      |    | 0.001 | 0.87 | 0.002      | J | 0.001 | 0.89 |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |            |    |        |      |            |    |       |      |            |   |       |      |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND         | U  | 0.24   | 5    | 0.17       | J  | 0.039 | 1    | 0.18       | J | 0.039 | 1    |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.35       | J  | 0.24   | 5    | 0.15       | J  | 0.039 | 1    | 0.55       |   | 0.039 | 1    |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 0.43       | J  | 0.24   | 5    | 0.2        |    | 0.039 | 1    | 0.54       |   | 0.039 | 1    |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.44       | J  | 0.24   | 5    | 0.16       | J  | 0.039 | 1    | 0.62       |   | 0.039 | 1    |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 0.68       | J  | 0.24   | 5    | 0.36       |    | 0.039 | 1    | 0.47       |   | 0.039 | 1    |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 0.44       | J  | 0.24   | 5    | 0.19       | J  | 0.039 | 1    | 0.6        |   | 0.039 | 1    |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND         | U  | 0.24   | 5    | 0.041      | J  | 0.039 | 1    | 0.053      | J | 0.039 | 1    |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | ND         | U  | 0.24   | 5    | 0.14       | J  | 0.039 | 1    | 0.18       | J | 0.039 | 1    |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 0.42       | J  | 0.24   | 5    | 0.24       |    | 0.039 | 1    | 0.59       |   | 0.039 | 1    |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | 0.52       | J  | 0.24   | 5    | 0.26       |    | 0.039 | 1    | 0.86       |   | 0.039 | 1    |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |            |    |        |      |            |    |       |      |            |   |       |      |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 1200       |    | 0.181  | 25   | 297        |    | 0.06  | 10   | 561        |   | 0.122 | 20   |
| General Chemistry                      |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |            |    |        |      |            |    |       |      |            |   |       |      |
| Moisture, Percent                      | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 29.7       |    | 0.5    | 1    | 14.4       |    | 0.5   | 1    | 14.9       |   | 0.5   | 1    |

Notes:

DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

Qualifiers:

Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

Exceedance Summary:

- 10
- 10
- 10
- RL exceeds the PADEP Non-Residential Soil MSC
- Concentration exceeds the PADEP Non-Residential Soil MSC
- Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-43      |    |        |      | BH-10-48      |    |        |      | BH-10-51      |    |        |      | BH-10-52      |    |        |        | BH-10-57      |    |        |        | BH-10-58      |    |       |       |
|----------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|--------|---------------|----|--------|--------|---------------|----|-------|-------|
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-43 0-2' |    |        |      | BH-10-48 0-2' |    |        |      | BH-10-51 0-2' |    |        |      | BH-10-52 0-2' |    |        |        | BH-10-57 0-2' |    |        |        | BH-10-58 0-2' |    |       |       |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/14/2011     |    |        |      | 4/14/2011     |    |        |      | 4/14/2011     |    |        |      | 4/14/2011     |    |        |        | 4/21/2011     |    |        |        | 4/14/2011     |    |       |       |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |        | Soil          |    |        |        | Soil          |    |       |       |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |        | 0-2 ft bgs    |    |        |        | 0-2 ft bgs    |    |       |       |
| Unit                                   | Result     | Q                                                                              | RL                                                                              | DF                                                  | Result                                                               | Q               | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q      | RL            | DF | Result | Q      | RL            | DF |       |       |
| Volatile Organic Compounds             |            |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |        |               |    |        |        |               |    |       |       |
| 1,1,1-Trichloroethane                  | 71-55-6    | 20                                                                             | 7.2                                                                             | 10000                                               | 20                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,1,2,2-Tetrachloroethane              | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 38                                                  | 0.03                                                                 | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane  | 76-13-1    | 10000                                                                          | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| 1,1,2-Trichloroethane                  | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 140                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,1-Dichloroethane                     | 75-34-3    | 16                                                                             | 3.9                                                                             | 1400                                                | 16                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,1-Dichloroethene                     | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 10000                                               | 0.7                                                                  | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,2,4-Trichlorobenzene                 | 120-82-1   | 7                                                                              | 27                                                                              | 10000                                               | 27                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,2-Dibromo-3-Chloropropane            | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.37                                                | 0.02                                                                 | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,2-Dichlorobenzene                    | 95-50-1    | 60                                                                             | 59                                                                              | 10000                                               | 60                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,2-Dichloroethane                     | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,2-Dichloropropane                    | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 220                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,3-Dichlorobenzene                    | 541-73-1   | 60                                                                             | 61                                                                              | 8400                                                | 61                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 1,4-Dichlorobenzene                    | 106-46-7   | 7.5                                                                            | 10                                                                              | 200                                                 | 10                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| 2-Hexanone                             | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 400                                                 | 4.4                                                                  | mg/kg           | ND            | U  | 0.003  | 0.74 | ND            | U  | 0.003  | 0.76 | ND            | U  | 0.004  | 0.99 | ND            | U  | 0.003  | 0.78   | ND            | U  | 2.3    | 607.74 | ND            | U  | 0.59  | 91.09 |
| Acetone                                | 67-64-1    | 9200                                                                           | 1000                                                                            | 10000                                               | 9200                                                                 | mg/kg           | 0.091         |    | 0.006  | 0.74 | 0.11          |    | 0.007  | 0.76 | 0.21          |    | 0.009  | 0.99 | 0.084         |    | 0.006  | 0.78   | ND            | U  | 5.3    | 607.74 | ND            | U  | 1.4   | 91.09 |
| Benzene                                | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.012         |    | 0.0004 | 0.74 | 0.007         |    | 0.0005 | 0.76 | 0.006         | J  | 0.0007 | 0.99 | 0.008         |    | 0.0005 | 0.78   | 1.2           | J  | 0.38   | 607.74 | ND            | U  | 0.099 | 91.09 |
| Bromodichloromethane                   | 75-27-4    | 8                                                                              | 2.7                                                                             | 60                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Bromoform                              | 75-25-2    | 8                                                                              | 3.5                                                                             | 2000                                                | 8                                                                    | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Bromomethane                           | 74-83-9    | 1                                                                              | 0.54                                                                            | 400                                                 | 1                                                                    | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| Carbon Disulfide                       | 75-15-0    | 620                                                                            | 530                                                                             | 10000                                               | 620                                                                  | mg/kg           | 0.004         | J  | 0.0009 | 0.74 | 0.002         | J  | 0.001  | 0.76 | 0.005         | J  | 0.001  | 0.99 | 0.002         | J  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Carbon Tetrachloride                   | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 150                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Chlorobenzene                          | 108-90-7   | 10                                                                             | 6.1                                                                             | 4000                                                | 10                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Chloroethane                           | 75-00-3    | 90                                                                             | 19                                                                              | 10000                                               | 90                                                                   | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| Chloroform                             | 67-66-3    | 8                                                                              | 2                                                                               | 97                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Chloromethane                          | 74-87-3    | 3                                                                              | 0.38                                                                            | 1200                                                | 3                                                                    | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| Cis-1,2-Dichloroethylene               | 156-59-2   | 7                                                                              | 1.6                                                                             | 10000                                               | 7                                                                    | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Cis-1,3-Dichloropropene                | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Cyclohexane                            | 110-82-7   | 5300                                                                           | 6900                                                                            | 10000                                               | 6900                                                                 | mg/kg           | ND            | U  | 0.0009 | 0.74 | 0.016         |    | 0.001  | 0.76 | 0.007         |    | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Dibromochloromethane                   | 124-48-1   | 8                                                                              | 2.5                                                                             | 82                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.0009 | 0.74 | ND            | U  | 0.001  | 0.76 | ND            | U  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | ND            | U  | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Dichlorodifluoromethane                | 75-71-8    | 100                                                                            | 100                                                                             | 10000                                               | 100                                                                  | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78   | ND            | U  | 1.5    | 607.74 | ND            | U  | 0.4   | 91.09 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7  | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | ND            | U  | 0.0009 | 0.74 | 0.014         |    | 0.001  | 0.76 | 0.027         |    | 0.001  | 0.99 | 0.001         | J  | 0.0009 | 0.78   | 25            |    | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Ethylbenzene                           | 100-41-4   | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | 0.001         | J  | 0.0009 | 0.74 | 0.001         | J  | 0.001  | 0.76 | 0.003         | J  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | 5.7           |    | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Isopropylbenzene (Cumene)              | 98-82-8    | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND            | U  | 0.0009 | 0.74 | 0.013         |    | 0.001  | 0.76 | 0.004         | J  | 0.001  | 0.99 | ND            | U  | 0.0009 | 0.78   | 22            |    | 0.76   | 607.74 | ND            | U  | 0.2   | 91.09 |
| Methyl Acetate                         | 79-20-9    | 10000                                                                          | 1900                                                                            | 10000                                               | 10000                                                                | mg/kg           | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.76 | ND            | U  | 0.003  | 0.99 | ND            | U  | 0.002  | 0.78</ |               |    |        |        |               |    |       |       |

Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-43      |    |        |   |      | BH-10-48      |        |   |      |    | BH-10-51      |   |      |    |        | BH-10-52      |     |    |        |    | BH-10-57      |    |        |   |    | BH-10-58      |  |  |  |  |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|----|--------|---|------|---------------|--------|---|------|----|---------------|---|------|----|--------|---------------|-----|----|--------|----|---------------|----|--------|---|----|---------------|--|--|--|--|
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-43 0-2' |    |        |   |      | BH-10-48 0-2' |        |   |      |    | BH-10-51 0-2' |   |      |    |        | BH-10-52 0-2' |     |    |        |    | BH-10-57 0-2' |    |        |   |    | BH-10-58 0-2' |  |  |  |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/14/2011     |    |        |   |      | 4/14/2011     |        |   |      |    | 4/14/2011     |   |      |    |        | 4/14/2011     |     |    |        |    | 4/21/2011     |    |        |   |    | 4/14/2011     |  |  |  |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |    |        |   |      | Soil          |        |   |      |    | Soil          |   |      |    |        | Soil          |     |    |        |    | Soil          |    |        |   |    | Soil          |  |  |  |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |    |        |   |      | 0-2 ft bgs    |        |   |      |    | 0-2 ft bgs    |   |      |    |        | 0-2 ft bgs    |     |    |        |    | 0-2 ft bgs    |    |        |   |    | 0-2 ft bgs    |  |  |  |  |
| Unit                                           | Result    | Q                                                                              | RL                                                                              | DF                                                  | Result                                                               | Q               | RL            | DF | Result | Q | RL   | DF            | Result | Q | RL   | DF | Result        | Q | RL   | DF | Result | Q             | RL  | DF | Result | Q  | RL            | DF | Result | Q | RL | DF            |  |  |  |  |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |   |      |               |        |   |      |    |               |   |      |    |        |               |     |    |        |    |               |    |        |   |    |               |  |  |  |  |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 190000                                              | 6100                                                                 | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2800                                                | 29                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 8400                                                | 2                                                                    | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 10000                                               | 200                                                                  | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 5600                                                | 20                                                                   | mg/kg           | ND            | U  | 2      | 5 | ND   | U             | 2.1    | 5 | ND   | U  | 2.2           | 5 | ND   | U  | 1.9    | 5             | ND  | U  | 21     | 10 | ND            | U  | 3.6    | 5 |    |               |  |  |  |  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 260                                                 | 0.84                                                                 | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 2800                                                | 10                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 190000                                              | 18000                                                                | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 10000                                               | 4.4                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 11000                                               | 1600                                                                 | mg/kg           | ND            | U  | 0.2    | 5 | 0.58 | J             | 0.21   | 5 | 0.96 | J  | 0.22          | 5 | ND   | U  | 0.19   | 5             | 2.7 | J  | 2.1    | 10 | 0.82          | J  | 0.36   | 5 |    |               |  |  |  |  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 140000                                              | 510                                                                  | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 22000                                               | 82                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 180                                                 | 32                                                                   | mg/kg           | ND            | U  | 0.59   | 5 | ND   | U             | 0.62   | 5 | ND   | U  | 0.67          | 5 | ND   | U  | 0.58   | 5             | ND  | U  | 6.2    | 10 | ND            | U  | 1.1    | 5 |    |               |  |  |  |  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 840                                                 | 3.1                                                                  | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 280                                                 | 1                                                                    | mg/kg           | ND            | U  | 0.98   | 5 | ND   | U             | 1      | 5 | ND   | U  | 1.1           | 5 | ND   | U  | 0.97   | 5             | ND  | U  | 10     | 10 | ND            | U  | 1.8    | 5 |    |               |  |  |  |  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 14000                                               | 110                                                                  | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 400                                                 | 1.6                                                                  | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 14000                                               | 51                                                                   | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 4000                                                | 13                                                                   | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 22000                                               | 6                                                                    | mg/kg           | ND            | U  | 0.98   | 5 | ND   | U             | 1      | 5 | ND   | U  | 1.1           | 5 | ND   | U  | 0.97   | 5             | ND  | U  | 10     | 10 | ND            | U  | 1.8    | 5 |    |               |  |  |  |  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 170000                                              | 4700                                                                 | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 170000                                              | 6900                                                                 | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 10000                                               | 1000                                                                 | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | 0.31 | J  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 340                                                 | 0.3                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | 0.39 | J             | 0.21   | 5 | ND   | U  | 0.22          | 5 | 0.61 | J  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | 0.42 | J             | 0.21   | 5 | 0.45 | J  | 0.22          | 5 | 0.59 | J  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | 0.61 | J             | 0.21   | 5 | 0.33 | J  | 0.22          | 5 | 0.68 | J  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | 0.42 | J             | 0.21   | 5 | 0.58 | J  | 0.22          | 5 | 0.44 | J  | 0.19   | 5             | 2.6 | J  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 1100                                                | 610                                                                  | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | 0.35 | J  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND            | U  | 0.39   | 5 | ND   | U             | 0.42   | 5 | ND   | U  | 0.45          | 5 | ND   | U  | 0.39   | 5             | ND  | U  | 4.1    | 10 | ND            | U  | 0.72   | 5 |    |               |  |  |  |  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 140000                                              | 2200                                                                 | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 6.7                                                 | 0.076                                                                | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   | 5             | ND  | U  | 2.1    | 10 | ND            | U  | 0.36   | 5 |    |               |  |  |  |  |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 220                                                 | 30                                                                   | mg/kg           | ND            | U  | 0.2    | 5 | ND   | U             | 0.21   | 5 | ND   | U  | 0.22          | 5 | ND   | U  | 0.19   |               |     |    |        |    |               |    |        |   |    |               |  |  |  |  |



Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-43      |   |        |    | BH-10-48      |   |        |    | BH-10-51      |   |        |    | BH-10-52      |   |        |    | BH-10-57      |   |        |    | BH-10-58      |   |        |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-43 0-2' |   |        |    | BH-10-48 0-2' |   |        |    | BH-10-51 0-2' |   |        |    | BH-10-52 0-2' |   |        |    | BH-10-57 0-2' |   |        |    | BH-10-58 0-2' |   |        |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/14/2011     |   |        |    | 4/14/2011     |   |        |    | 4/14/2011     |   |        |    | 4/14/2011     |   |        |    | 4/21/2011     |   |        |    | 4/14/2011     |   |        |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |        |    | Soil          |   |        |    | Soil          |   |        |    | Soil          |   |        |    | Soil          |   |        |    | Soil          |   |        |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |        |    | 0-2 ft bgs    |   |        |    | 0-2 ft bgs    |   |        |    | 0-2 ft bgs    |   |        |    | 0-2 ft bgs    |   |        |    | 0-2 ft bgs    |   |        |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 50                                                  | 0.96                                                                 | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 1000                                                | 39                                                                   | mg/kg           | ND            | U | 0.39   | 5  | ND            | U | 0.42   | 5  | ND            | U | 0.45   | 5  | ND            | U | 0.39   | 5  | ND            | U | 4.1    | 10 | ND            | U | 0.72   | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 10000                                               | 91                                                                   | mg/kg           | ND            | U | 0.98   | 5  | ND            | U | 1      | 5  | ND            | U | 1.1    | 5  | ND            | U | 0.97   | 5  | ND            | U | 10     | 10 | ND            | U | 1.8    | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 550                                                 | 0.56                                                                 | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 0.2    | 5  | 0.31          | J | 0.21   | 5  | ND            | U | 0.22   | 5  | 0.35          | J | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 10000                                               | 10                                                                   | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | ND            | U | 0.2    | 5  | 0.23          | J | 0.21   | 5  | 0.24          | J | 0.22   | 5  | ND            | U | 0.19   | 5  | 5.7           | J | 2.1    | 10 | 0.4           | J | 0.36   | 5  |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 5600                                                | 20                                                                   | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 11                                                  | 0.037                                                                | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 16000                                               | 83                                                                   | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 660                                                 | 5                                                                    | mg/kg           | ND            | U | 0.98   | 5  | ND            | U | 1      | 5  | ND            | U | 1.1    | 5  | ND            | U | 0.97   | 5  | ND            | U | 10     | 10 | ND            | U | 1.8    | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | ND            | U | 0.2    | 5  | 0.42          | J | 0.21   | 5  | 0.68          | J | 0.22   | 5  | 1.1           |   | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 190000                                              | 200                                                                  | mg/kg           | ND            | U | 0.2    | 5  | ND            | U | 0.21   | 5  | ND            | U | 0.22   | 5  | ND            | U | 0.19   | 5  | ND            | U | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | ND            | U | 0.2    | 5  | 0.47          | J | 0.21   | 5  | 0.59          | J | 0.22   | 5  | 0.98          |   | 0.19   | 5  | 4             | J | 2.1    | 10 | ND            | U | 0.36   | 5  |
| Metals                    |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | 190000                                              | 190000                                                               | mg/kg           | 18800         |   | 5.79   | 1  | 22200         |   | 6.06   | 1  | 20100         |   | 6.76   | 1  | 12600         |   | 5.79   | 1  | 15100         |   | 6.14   | 1  | 24900         |   | 10.9   | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 1100                                                | 27                                                                   | mg/kg           | ND            | U | 1.15   | 1  | ND            | U | 1.21   | 1  | 13.5          |   | 1.34   | 1  | ND            | U | 1.15   | 1  | 1.92          | J | 1.22   | 1  | ND            | U | 2.17   | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 53                                                  | 29                                                                   | mg/kg           | 14.7          |   | 1.09   | 1  | 20            |   | 1.15   | 1  | 21.3          |   | 1.28   | 1  | 12.2          |   | 1.09   | 1  | 21.1          |   | 1.16   | 1  | 18.6          |   | 2.07   | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 190000                                              | 8200                                                                 | mg/kg           | 212           |   | 0.046  | 1  | 317           |   | 0.0482 | 1  | 271           |   | 0.0537 | 1  | 174           |   | 0.0461 | 1  | 188           |   | 0.0488 | 1  | 735           |   | 0.087  | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 5600                                                | 320                                                                  | mg/kg           | 0.692         |   | 0.0782 | 1  | 0.857         |   | 0.082  | 1  | 0.767         |   | 0.0913 | 1  | 0.649         |   | 0.0783 | 1  | 0.742         |   | 0.083  | 1  | 0.724         | J | 0.148  | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 1400                                                | 38                                                                   | mg/kg           | ND            | U | 0.161  | 1  | 2.22          |   | 0.169  | 1  | 0.945         |   | 0.188  | 1  | 0.238         | J | 0.161  | 1  | 0.792         |   | 0.171  | 1  | 1.26          |   | 0.304  | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | 18100         |   | 7.05   | 1  | 93700         |   | 36.9   | 5  | 112000        |   | 41.2   | 5  | 9200          |   | 7.06   | 1  | 16200         |   | 7.48   | 1  | 48000         |   | 13.3   | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | 56            |   | 0.679  | 1  | 250           |   | 0.711  | 1  | 1880          |   | 0.792  | 1  | 52            |   | 0.68   | 1  | 88.5          |   | 0.72   | 1  | 57.3          |   | 1.28   | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 840                                                 | 140                                                                  | mg/kg           | 8.32          |   | 0.219  | 1  | 8.12          |   | 0.229  | 1  | 10.2          |   | 0.255  | 1  | 7.07          |   | 0.219  | 1  | 8.42          |   | 0.232  | 1  | 11.3          |   | 0.413  | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 100000                                              | 43000                                                                | mg/kg           | 98.2          |   | 0.253  | 1  | 187           |   | 0.265  | 1  | 246           |   | 0.295  | 1  | 79.3          |   | 0.253  | 1  | 131           |   | 0.269  | 1  | 363           |   | 0.478  | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | 190000                                              | 190000                                                               | mg/kg           | 23000         |   | 5.42   | 1  | 42300         |   | 28.4   | 5  | 23400         |   | 6.33   | 1  | 19800         |   | 5.43   | 1  | 20100         |   | 5.75   | 1  | 28900         |   | 10.2   | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 167           |   | 0.69   | 1  | 278           |   | 0.723  | 1  | 1720          |   | 4.03   | 5  | 1480          |   | 3.46   | 5  | 743           |   | 0.733  | 1  | 941           |   | 1.3    | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | 6630          |   | 2.92   | 1  | 36900         |   | 3.06   | 1  | 43400         |   | 3.41   | 1  | 4510          |   | 2.93   | 1  | 6350          |   | 3.1    | 1  | 33200         |   | 5.52   | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 130000                                              | 2000                                                                 | mg/kg           | 451           |   | 0.0897 | 1  | 2810          |   | 0.47   | 5  | 602           |   | 0.105  | 1  | 276           |   | 0.0899 | 1  | 596           |   | 0.0952 | 1  | 730           |   | 0.17   | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 450                                                 | 10                                                                   | mg/kg           | 0.111         | J | 0.0033 | 1  | 0.0867        | J | 0.0035 | 1  | 1.52          |   | 0.0189 | 5  | 0.715         |   | 0.0034 | 1  | 0.607         |   | 0.0034 | 1  | 4.82          |   | 0.0295 | 5  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 56000                                               | 650                                                                  | mg/kg           | 37.6          |   | 0.219  | 1  | 52            |   | 0.229  | 1  | 100           |   | 0.255  | 1  | 24.9          |   | 0.219  | 1  | 40.1          |   | 0.232  | 1  | 61.6          |   | 0.413  | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | 1430          |   | 20.7   | 1  | 1260          |   | 21.7   | 1  | 874           |   | 24.2   | 1  | 1520          |   | 20.7   | 1  | 1020          |   | 22     | 1  | 990           |   | 39.1   | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 14000                                               | 26                                                                   | mg/kg           | ND            | U | 1.13   | 1  | 2.58          |   | 1.18   | 1  | ND            | U | 1.32   | 1  | ND            | U | 1.13   | 1  | 2.26          | J | 1.2    | 1  | ND            | U | 2.13   | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 14000                                               | 84                                                                   | mg/kg           | ND            | U | 0.207  | 1  | ND            | U | 0.217  | 1  | ND            | U | 0.242  | 1  | ND            | U | 0.207  | 1  | 0.226         | J | 0.22   | 1  | 0.58          | J | 0.391  | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | 130           |   | 42.9   | 1  | 748           |   | 45     | 1  | 323           |   | 50.1   | 1  | 107           | J | 43     | 1  | 177           |   | 45.5   | 1  | 212           | J | 81.1   | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 200                                                 | 14                                                                   | mg/kg           | ND            | U | 1.67   | 1  | ND            | U | 1.75   | 1  | ND            | U | 1.95   | 1  | ND            | U | 1.67   | 1  | ND            | U | 1.77   | 1  | ND            | U | 3.15   | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 20000                                               | 20000                                                                | mg/kg           | 84.8          |   | 0.219  | 1  | 233           |   | 0.229  | 1  | 259           |   | 0.255  | 1  | 51.6          |   | 0.219  | 1  | 91.7          |   | 0.232  | 1  | 100           |   | 0.413  | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 190000                                              | 12000                                                                | mg/kg           | 113           |   | 0.759  | 1  | 750           |   | 0.796  | 1  | 893           |   | 0.886  | 1  | 177           |   | 0.76   | 1  | 260           |   | 0.806  | 1  | 431           |   | 1.43   | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %               | 15.6          |   | 0.5    | 1  | 21            |   | 0.5    | 1  | 27            |   | 0.5    | 1  | 14.9          |   | 0.5    | 1  | 19.7          |   | 0.5    | 1  | 54            |   | 0.5    | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).  
**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-65      |    |        |   | BH-10-68      |    |        |      | BH-10-75      |    |        |      | BH-10-81      |    |        |      | BH-10-82      |    |        |      | BH-10-83      |    |       |      |
|----------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|----|--------|---|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|--------|------|---------------|----|-------|------|
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-65 0-2' |    |        |   | BH-10-68 0-2' |    |        |      | BH-10-75 0-2' |    |        |      | BH-10-81 0-2' |    |        |      | BH-10-82 0-2' |    |        |      | BH-10-83 0-2' |    |       |      |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/14/2011     |    |        |   | 4/14/2011     |    |        |      | 4/19/2011     |    |        |      | 4/21/2011     |    |        |      | 4/20/2011     |    |        |      | 4/21/2011     |    |       |      |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |    |        |   | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |        |      | Soil          |    |       |      |
|                                        |            |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |    |        |   | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |        |      | 0-2 ft bgs    |    |       |      |
| Unit                                   | Result     | Q                                                                              | RL                                                                              | DF                                                  | Result                                                               | Q               | RL            | DF | Result | Q | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF | Result | Q    | RL            | DF |       |      |
| Volatile Organic Compounds             |            |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |    |        |   |               |    |        |      |               |    |        |      |               |    |        |      |               |    |        |      |               |    |       |      |
| 1,1,1-Trichloroethane                  | 71-55-6    | 20                                                                             | 7.2                                                                             | 10000                                               | 20                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,1,2,2-Tetrachloroethane              | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 38                                                  | 0.03                                                                 | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane  | 76-13-1    | 10000                                                                          | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| 1,1,2-Trichloroethane                  | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 140                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,1-Dichloroethane                     | 75-34-3    | 16                                                                             | 3.9                                                                             | 1400                                                | 16                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,1-Dichloroethene                     | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 10000                                               | 0.7                                                                  | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,2,4-Trichlorobenzene                 | 120-82-1   | 7                                                                              | 27                                                                              | 10000                                               | 27                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,2-Dibromo-3-Chloropropane            | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.37                                                | 0.02                                                                 | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,2-Dichlorobenzene                    | 95-50-1    | 60                                                                             | 59                                                                              | 10000                                               | 60                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,2-Dichloroethane                     | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,2-Dichloropropane                    | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 220                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,3-Dichlorobenzene                    | 541-73-1   | 60                                                                             | 61                                                                              | 8400                                                | 61                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 1,4-Dichlorobenzene                    | 106-46-7   | 7.5                                                                            | 10                                                                              | 200                                                 | 10                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| 2-Hexanone                             | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 400                                                 | 4.4                                                                  | mg/kg           | ND            | U  | 0.004  | 1 | ND            | U  | 0.003  | 0.74 | ND            | U  | 0.003  | 0.82 | ND            | U  | 0.003  | 0.77 | ND            | U  | 0.004  | 0.77 | ND            | U  | 0.004 | 0.98 |
| Acetone                                | 67-64-1    | 9200                                                                           | 1000                                                                            | 10000                                               | 9200                                                                 | mg/kg           | 0.36          |    | 0.01   | 1 | 0.087         |    | 0.006  | 0.74 | 0.099         |    | 0.007  | 0.82 | 0.033         |    | 0.006  | 0.77 | 0.32          |    | 0.008  | 0.77 | 0.26          |    | 0.009 | 0.98 |
| Benzene                                | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.033         |    | 0.0007 | 1 | 0.003         | J  | 0.0004 | 0.74 | 0.005         |    | 5E-04  | 0.82 | 0.0008        | J  | 5E-04  | 0.77 | 0.001         | J  | 6E-04  | 0.77 | 0.012         |    | 6E-04 | 0.98 |
| Bromodichloromethane                   | 75-27-4    | 8                                                                              | 2.7                                                                             | 60                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Bromoform                              | 75-25-2    | 8                                                                              | 3.5                                                                             | 2000                                                | 8                                                                    | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Bromomethane                           | 74-83-9    | 1                                                                              | 0.54                                                                            | 400                                                 | 1                                                                    | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| Carbon Disulfide                       | 75-15-0    | 620                                                                            | 530                                                                             | 10000                                               | 620                                                                  | mg/kg           | 0.005         | J  | 0.001  | 1 | 0.004         | J  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | 0.004         | J  | 0.001 | 0.98 |
| Carbon Tetrachloride                   | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 150                                                 | 0.5                                                                  | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Chlorobenzene                          | 108-90-7   | 10                                                                             | 6.1                                                                             | 4000                                                | 10                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Chloroethane                           | 75-00-3    | 90                                                                             | 19                                                                              | 10000                                               | 90                                                                   | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| Chloroform                             | 67-66-3    | 8                                                                              | 2                                                                               | 97                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Chloromethane                          | 74-87-3    | 3                                                                              | 0.38                                                                            | 1200                                                | 3                                                                    | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| Cis-1,2-Dichloroethylene               | 156-59-2   | 7                                                                              | 1.6                                                                             | 10000                                               | 7                                                                    | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Cis-1,3-Dichloropropene                | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Cyclohexane                            | 110-82-7   | 5300                                                                           | 6900                                                                            | 10000                                               | 6900                                                                 | mg/kg           | 0.009         |    | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Dibromochloromethane                   | 124-48-1   | 8                                                                              | 2.5                                                                             | 82                                                  | 8                                                                    | mg/kg           | ND            | U  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Dichlorodifluoromethane                | 75-71-8    | 100                                                                            | 100                                                                             | 10000                                               | 100                                                                  | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7  | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.012         |    | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | 0.002         | J  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | 0.002         | J  | 0.001 | 0.98 |
| Ethylbenzene                           | 100-41-4   | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | 0.002         | J  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Isopropylbenzene (Cumene)              | 98-82-8    | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | 0.002         | J  | 0.001  | 1 | ND            | U  | 0.0009 | 0.74 | ND            | U  | 9E-04  | 0.82 | ND            | U  | 9E-04  | 0.77 | ND            | U  | 0.001  | 0.77 | ND            | U  | 0.001 | 0.98 |
| Methyl Acetate                         | 79-20-9    | 10000                                                                          | 1900                                                                            | 10000                                               | 10000                                                                | mg/kg           | ND            | U  | 0.003  | 1 | ND            | U  | 0.002  | 0.74 | ND            | U  | 0.002  | 0.82 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.002  | 0.77 | ND            | U  | 0.003 | 0.98 |
| Methyl Ethyl Ketone (2-Butanone)       | 78-93-3    | 400                                                                            | 76                                                                              | 10000                                               | 400                                                                  | mg/kg           | 0.048         |    | 0.006  | 1 | 0.009         |    | 0.004  | 0.74 | 0.015         |    | 0.004  | 0.82 | ND            | U  | 0.004  | 0.77 | 0.013         |    | 0.005  | 0.77 | 0.027         |    | 0.005 |      |



Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-65      |   |      |    | BH-10-68      |   |      |    | BH-10-75      |   |       |    | BH-10-81      |   |      |    | BH-10-82      |   |      |     | BH-10-83      |   |       |    |  |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|---------------|---|------|----|---------------|---|------|----|---------------|---|-------|----|---------------|---|------|----|---------------|---|------|-----|---------------|---|-------|----|--|
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-65 0-2' |   |      |    | BH-10-68 0-2' |   |      |    | BH-10-75 0-2' |   |       |    | BH-10-81 0-2' |   |      |    | BH-10-82 0-2' |   |      |     | BH-10-83 0-2' |   |       |    |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/14/2011     |   |      |    | 4/14/2011     |   |      |    | 4/19/2011     |   |       |    | 4/21/2011     |   |      |    | 4/20/2011     |   |      |     | 4/21/2011     |   |       |    |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil          |   |      |    | Soil          |   |      |    | Soil          |   |       |    | Soil          |   |      |    | Soil          |   |      |     | Soil          |   |       |    |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs    |   |      |    | 0-2 ft bgs    |   |      |    | 0-2 ft bgs    |   |       |    | 0-2 ft bgs    |   |      |    | 0-2 ft bgs    |   |      |     | 0-2 ft bgs    |   |       |    |  |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result        | Q | RL   | DF | Result        | Q | RL   | DF | Result        | Q | RL    | DF | Result        | Q | RL   | DF | Result        | Q | RL   | DF  | Result        | Q | RL    | DF |  |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |               |   |      |    |               |   |      |    |               |   |       |    |               |   |      |    |               |   |      |     |               |   |       |    |  |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 190000                                              | 6100                                                                 | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2800                                                | 29                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 8400                                                | 2                                                                    | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 10000                                               | 200                                                                  | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 5600                                                | 20                                                                   | mg/kg           | ND            | U | 2.3  | 5  | ND            | U | 2    | 5  | ND            | U | 0.38  | 1  | ND            | U | 0.4  | 1  | ND            | U | 0.5  | 1   | ND            | U | 0.43  | 1  |  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 260                                                 | 0.84                                                                 | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 2800                                                | 10                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 190000                                              | 18000                                                                | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 10000                                               | 4.4                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 11000                                               | 1600                                                                 | mg/kg           | 0.41          | J | 0.23 | 5  | ND            | U | 0.2  | 5  | 0.26          |   | 0.038 | 1  | 0.51          |   | 0.04 | 1  | 0.15          | J | 0.05 | 1   | 0.2           | J | 0.043 | 1  |  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 140000                                              | 510                                                                  | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 22000                                               | 82                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 180                                                 | 32                                                                   | mg/kg           | ND            | U | 0.68 | 5  | ND            | U | 0.59 | 5  | ND            | U | 0.11  | 1  | ND            | U | 0.12 | 1  | ND            | U | 0.15 | 1   | ND            | U | 0.13  | 1  |  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 840                                                 | 3.1                                                                  | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 280                                                 | 1                                                                    | mg/kg           | ND            | U | 1.1  | 5  | ND            | U | 0.98 | 5  | ND            | U | 0.19  | 1  | ND            | U | 0.2  | 1  | ND            | U | 0.25 | 1   | ND            | U | 0.22  | 1  |  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 14000                                               | 110                                                                  | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 400                                                 | 1.6                                                                  | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 14000                                               | 51                                                                   | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 4000                                                | 13                                                                   | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 22000                                               | 6                                                                    | mg/kg           | ND            | U | 1.1  | 5  | ND            | U | 0.98 | 5  | ND            | U | 0.19  | 1  | ND            | U | 0.2  | 1  | ND            | U | 0.25 | 1   | ND            | U | 0.22  | 1  |  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 170000                                              | 4700                                                                 | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 0.36          |   | 0.038 | 1  | 0.083         | J | 0.04 | 1  | 0.25          |   | 0.05 | 1   | 0.093         | J | 0.043 | 1  |  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 170000                                              | 6900                                                                 | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 0.31          |   | 0.038 | 1  | 0.064         | J | 0.04 | 1  | 0.096         | J | 0.05 | 1   | 0.077         | J | 0.043 | 1  |  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 10000                                               | 1000                                                                 | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 1.2           |   | 0.038 | 1  | 0.39          |   | 0.04 | 1  | 0.74          |   | 0.05 | 1   | 0.27          |   | 0.043 | 1  |  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 340                                                 | 0.3                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | ND            | U | 0.086 | 1  |  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 3.8           |   | 0.038 | 1  | 1.9           |   | 0.04 | 1  | 1.3           |   | 0.05 | 1   | 0.73          |   | 0.043 | 1  |  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 2.8           |   | 0.038 | 1  | 2.7           |   | 0.04 | 1  | 0.96          |   | 0.05 | 1   | 0.68          |   | 0.043 | 1  |  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 3.6           |   | 0.038 | 1  | 2.5           |   | 0.04 | 1  | 1.1           |   | 0.05 | 1   | 0.89          |   | 0.043 | 1  |  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 1.9           |   | 0.038 | 1  | 3.1           |   | 0.04 | 1  | 0.54          |   | 0.05 | 1   | 0.59          |   | 0.043 | 1  |  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 1100                                                | 610                                                                  | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 2.1           |   | 0.038 | 1  | 0.84          |   | 0.04 | 1  | 0.63          |   | 0.05 | 1   | 0.37          |   | 0.043 | 1  |  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND            | U | 0.45 | 5  | ND            | U | 0.39 | 5  | ND            | U | 0.077 | 1  | ND            | U | 0.08 | 1  | ND            | U | 0.1  | 1   | 0.74          |   | 0.086 | 1  |  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 140000                                              | 2200                                                                 | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | 0.056         | J | 0.038 | 1  | 0.075         | J | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 6.7                                                 | 0.076                                                                | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1   | ND            | U | 0.043 | 1  |  |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 220                                                 | 30                                                                   | mg/kg           | ND            | U | 0.23 | 5  | ND            | U | 0.2  | 5  | ND            | U | 0.038 | 1  | ND            | U | 0.04 | 1  | ND            | U | 0.05 | 1</ |               |   |       |    |  |

Table 5  
Summary of Shallow Soil Sample Analytical Results for CAMU Delineation Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | BH-10-65      |   |             |    | BH-10-68      |   |            |    | BH-10-75      |   |              |    | BH-10-81      |   |             |    | BH-10-82      |   |             |    | BH-10-83      |   |              |    |
|---------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|---------------|---|-------------|----|---------------|---|------------|----|---------------|---|--------------|----|---------------|---|-------------|----|---------------|---|-------------|----|---------------|---|--------------|----|
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample ID       | BH-10-65 0-2' |   |             |    | BH-10-68 0-2' |   |            |    | BH-10-75 0-2' |   |              |    | BH-10-81 0-2' |   |             |    | BH-10-82 0-2' |   |             |    | BH-10-83 0-2' |   |              |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Date     | 4/14/2011     |   |             |    | 4/14/2011     |   |            |    | 4/19/2011     |   |              |    | 4/21/2011     |   |             |    | 4/20/2011     |   |             |    | 4/21/2011     |   |              |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Matrix   | Soil          |   |             |    | Soil          |   |            |    | Soil          |   |              |    | Soil          |   |             |    | Soil          |   |             |    | Soil          |   |              |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Interval | 0-2 ft bgs    |   |             |    | 0-2 ft bgs    |   |            |    | 0-2 ft bgs    |   |              |    | 0-2 ft bgs    |   |             |    | 0-2 ft bgs    |   |             |    | 0-2 ft bgs    |   |              |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Unit            | Result        | Q | RL          | DF | Result        | Q | RL         | DF | Result        | Q | RL           | DF | Result        | Q | RL          | DF | Result        | Q | RL          | DF | Result        | Q | RL           | DF |
| Fluorene                  | 86-73-7   | 190                                                                                     | 3800                                                                                     | 110000                                                    | 3800                                                                             | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | 0.34          |   | 0.038        | 1  | 0.1           | J | 0.04        | 1  | 0.28          |   | 0.05        | 1  | 0.094         | J | 0.043        | 1  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                                     | 0.96                                                                                     | 50                                                        | 0.96                                                                             | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                                     | 39                                                                                       | 1000                                                      | 39                                                                               | mg/kg           | ND            | U | 0.45        | 5  | ND            | U | 0.39       | 5  | ND            | U | 0.077        | 1  | ND            | U | 0.08        | 1  | ND            | U | 0.1         | 1  | ND            | U | 0.086        | 1  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                                       | 91                                                                                       | 10000                                                     | 91                                                                               | mg/kg           | ND            | U | 1.1         | 5  | ND            | U | 0.98       | 5  | ND            | U | 0.19         | 1  | ND            | U | 0.2         | 1  | ND            | U | 0.25        | 1  | ND            | U | 0.22         | 1  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                                     | 0.56                                                                                     | 550                                                       | 0.56                                                                             | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                                    | 28000                                                                                    | 110                                                       | 110                                                                              | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | 1.8           |   | 0.038        | 1  | 1.9           |   | 0.04        | 1  | 0.55          |   | 0.05        | 1  | 0.44          |   | 0.043        | 1  |
| Isophorone                | 78-59-1   | 10                                                                                      | 1.9                                                                                      | 10000                                                     | 10                                                                               | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| Naphthalene               | 91-20-3   | 10                                                                                      | 25                                                                                       | 56000                                                     | 25                                                                               | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | 0.29          |   | 0.038        | 1  | 0.36          |   | 0.04        | 1  | 0.16          | J | 0.05        | 1  | 0.16          | J | 0.043        | 1  |
| Nitrobenzene              | 98-95-3   | 20                                                                                      | 8.7                                                                                      | 5600                                                      | 20                                                                               | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                                   | 0.0051                                                                                   | 11                                                        | 0.037                                                                            | mg/kg           | ND            | U | <b>0.23</b> | 5  | ND            | U | <b>0.2</b> | 5  | ND            | U | <b>0.038</b> | 1  | ND            | U | <b>0.04</b> | 1  | ND            | U | <b>0.05</b> | 1  | ND            | U | <b>0.043</b> | 1  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                                      | 83                                                                                       | 16000                                                     | 83                                                                               | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                                     | 5                                                                                        | 660                                                       | 5                                                                                | mg/kg           | ND            | U | 1.1         | 5  | ND            | U | 0.98       | 5  | ND            | U | 0.19         | 1  | ND            | U | 0.2         | 1  | ND            | U | 0.25        | 1  | ND            | U | 0.22         | 1  |
| Phenanthrene              | 85-01-8   | 110                                                                                     | 10000                                                                                    | 190000                                                    | 10000                                                                            | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | 4.8           |   | 0.077        | 2  | 1.6           |   | 0.04        | 1  | 2.5           |   | 0.05        | 1  | 1             |   | 0.043        | 1  |
| Phenol                    | 108-95-2  | 200                                                                                     | 33                                                                                       | 190000                                                    | 200                                                                              | mg/kg           | ND            | U | 0.23        | 5  | 1.3           |   | 0.2        | 5  | ND            | U | 0.038        | 1  | ND            | U | 0.04        | 1  | ND            | U | 0.05        | 1  | ND            | U | 0.043        | 1  |
| Pyrene                    | 129-00-0  | 13                                                                                      | 2200                                                                                     | 84000                                                     | 2200                                                                             | mg/kg           | ND            | U | 0.23        | 5  | ND            | U | 0.2        | 5  | 5.4           |   | 0.077        | 2  | 2             |   | 0.04        | 1  | 2.5           |   | 0.05        | 1  | 1.1           |   | 0.043        | 1  |
| Metals                    |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |               |   |             |    |               |   |            |    |               |   |              |    |               |   |             |    |               |   |             |    |               |   |              |    |
| Aluminum                  | 7429-90-5 | NS                                                                                      | NS                                                                                       | 190000                                                    | 190000                                                                           | mg/kg           | 13100         |   | 6.92        | 1  | 22600         |   | 5.7        | 1  | 15700         |   | 5.68         | 1  | 10100         |   | 29.6        | 5  | 26300         |   | 7.56        | 1  | 17200         |   | 6.41         | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                                     | 27                                                                                       | 1100                                                      | 27                                                                               | mg/kg           | ND            | U | 1.38        | 1  | ND            | U | 1.13       | 1  | 1.47          | J | 1.13         | 1  | ND            | U | 5.88        | 5  | ND            | U | 1.5         | 1  | ND            | U | 1.27         | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                                       | 29                                                                                       | 53                                                        | 29                                                                               | mg/kg           | 8.71          |   | 1.31        | 1  | 7.99          |   | 1.08       | 1  | <b>61.3</b>   |   | 1.07         | 1  | <b>38.9</b>   |   | 5.58        | 5  | 17            |   | 1.43        | 1  | 13.7          |   | 1.21         | 1  |
| Barium                    | 7440-39-3 | 200                                                                                     | 8200                                                                                     | 190000                                                    | 8200                                                                             | mg/kg           | 170           |   | 0.055       | 1  | 135           |   | 0.0454     | 1  | 147           |   | 0.045        | 1  | 122           |   | 0.047       | 1  | 261           |   | 0.06        | 1  | 272           |   | 0.051        | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                                     | 320                                                                                      | 5600                                                      | 320                                                                              | mg/kg           | 0.503         | J | 0.0935      | 1  | 1.11          |   | 0.0771     | 1  | 0.856         |   | 0.077        | 1  | 0.698         |   | 0.08        | 1  | 1.1           |   | 0.102       | 1  | 0.797         |   | 0.087        | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                                     | 38                                                                                       | 1400                                                      | 38                                                                               | mg/kg           | 0.403         | J | 0.193       | 1  | ND            | U | 0.159      | 1  | 0.418         | J | 0.158        | 1  | ND            | U | 0.823       | 5  | ND            | U | 0.21        | 1  | 3.98          |   | 0.178        | 1  |
| Calcium                   | 7440-70-2 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 20200         |   | 8.43        | 1  | 25900         |   | 6.95       | 1  | 9930          |   | 6.92         | 1  | 6520          |   | 7.21        | 1  | 21500         |   | 9.21        | 1  | 15800         |   | 7.82         | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 27            |   | 0.812       | 1  | 142           |   | 0.669      | 1  | 45.5          |   | 0.666        | 1  | 54.8          |   | 3.47        | 5  | 117           |   | 0.886       | 1  | 86.9          |   | 0.752        | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                                       | 140                                                                                      | 840                                                       | 140                                                                              | mg/kg           | 5.34          |   | 0.261       | 1  | 9             |   | 0.215      | 1  | 8.16          |   | 0.215        | 1  | 13.1          |   | 1.12        | 5  | 11            |   | 0.285       | 1  | 9.93          |   | 0.242        | 1  |
| Copper                    | 7440-50-8 | 100                                                                                     | 43000                                                                                    | 100000                                                    | 43000                                                                            | mg/kg           | 86.7          |   | 0.303       | 1  | 41.2          |   | 0.249      | 1  | 61.8          |   | 0.248        | 1  | 94.2          |   | 1.29        | 5  | 122           |   | 0.331       | 1  | 212           |   | 0.28         | 1  |
| Iron                      | 7439-89-6 | NS                                                                                      | NS                                                                                       | 190000                                                    | 190000                                                                           | mg/kg           | 14900         |   | 6.48        | 1  | 30000         |   | 5.34       | 1  | 26000         |   | 5.32         | 1  | 68100         |   | 27.7        | 5  | 47200         |   | 35.4        | 5  | 28400         |   | 6            | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                                     | 450                                                                                      | 1000                                                      | 450                                                                              | mg/kg           | 307           |   | 0.825       | 1  | 94.2          |   | 0.68       | 1  | 192           |   | 0.678        | 1  | 242           |   | 3.53        | 5  | <b>584</b>    |   | 0.901       | 1  | 402           |   | 0.765        | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 11200         |   | 3.49        | 1  | 13800         |   | 2.88       | 1  | 3960          |   | 2.87         | 1  | 3040          |   | 2.99        | 1  | 7070          |   | 3.82        | 1  | 7310          |   | 3.24         | 1  |
| Manganese                 | 7439-96-5 | 30                                                                                      | 2000                                                                                     | 130000                                                    | 2000                                                                             | mg/kg           | 382           |   | 0.107       | 1  | 777           |   | 0.0884     | 1  | 464           |   | 0.088        | 1  | 539           |   | 0.092       | 1  | 576           |   | 0.117       | 1  | 384           |   | 0.099        | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                                     | 10                                                                                       | 450                                                       | 10                                                                               | mg/kg           | 0.648         |   | 0.0038      | 1  | 0.335         |   | 0.0032     | 1  | 0.182         |   | 0.003        | 1  | 0.373         |   | 0.003       | 1  | 0.215         |   | 0.004       | 1  | 0.387         |   | 0.004        | 1  |
| Nickel                    | 7440-02-0 | 10                                                                                      | 650                                                                                      | 56000                                                     | 650                                                                              | mg/kg           | 24.1          |   | 0.261       | 1  | 30.2          |   | 0.215      | 1  | 25.3          |   | 0.215        | 1  | 37.2          |   | 1.12        | 5  | 41.6          |   | 0.285       | 1  | 44.8          |   | 0.242        | 1  |
| Potassium                 | 7440-09-7 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 836           |   | 24.8        | 1  | 1050          |   | 20.4       | 1  | 1630          |   | 20.3         | 1  | 1690          |   | 106         | 5  | 2020          |   | 27          | 1  | 1820          |   | 22.9         | 1  |
| Selenium                  | 7782-49-2 | 5                                                                                       | 26                                                                                       | 14000                                                     | 26                                                                               | mg/kg           | ND            | U | 1.35        | 1  | ND            | U | 1.11       | 1  | ND            | U | 1.11         | 1  | ND            | U | 5.76        | 5  | ND            | U | 7.36        | 5  | 1.68          | J | 1.25         | 1  |
| Silver                    | 7440-22-4 | 10                                                                                      | 84                                                                                       | 14000                                                     | 84                                                                               | mg/kg           | ND            | U | 0.248       | 1  | ND            | U | 0.204      | 1  | ND            | U | 0.203        | 1  | ND            | U | 1.06        | 5  | ND            | U | 0.27        | 1  | ND            | U | 0.229        | 1  |
| Sodium                    | 7440-23-5 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 99.3          | J | 51.3        | 1  | 88.4          | J | 42.3       | 1  | 292           |   | 42.1         | 1  | 138           |   | 43.8        | 1  | 105           | J | 56          | 1  | 160           |   | 47.6         | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                                     | 14                                                                                       | 200                                                       | 14                                                                               | mg/kg           | ND            | U | 1.99        | 1  | ND            | U | 1.64       | 1  | 2.02          | J | 1.64         | 1  | ND            | U | 8.52        | 5  | ND            | U | 10.9        | 5  | ND            | U | 1.85         | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                                      | 72000                                                                                    | 20000                                                     | 20000                                                                            | mg/kg           | 48.8          |   | 0.261       | 1  | 60.8          |   | 0.215      | 1  | 62.9          |   | 0.215        | 1  | 63.1          |   | 1.12        | 5  | 106           |   | 0.285       | 1  | 65.3          |   | 0.242        | 1  |
| Zinc                      | 7440-66-6 | 200                                                                                     | 12000                                                                                    | 190000                                                    | 12000                                                                            | mg/kg           | 181           |   | 0.908       | 1  | 115           |   | 0.748      | 1  | 189           |   | 0.745        | 1  | 141           |   | 3.88        | 5  | 271           |   | 0.992       | 1  | 369           |   | 0.841        | 1  |
| General Chemistry         |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |               |   |             |    |               |   |            |    |               |   |              |    |               |   |             |    |               |   |             |    |               |   |              |    |
| Moisture, Percent         | MOIST     | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | %               | 27.3          |   | 0.5         | 1  | 16            |   | 0.5        | 1  | 13.2          |   | 0.5          | 1  | 16.6          |   | 0.5         | 1  | 34.1          |   | 0.5         | 1  | 23.1          |   | 0.5          | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).  
**Exceedance Summary:**  
**10** - RL exceeds the PADEP Non-Residential Soil MSC  
**10** - Concentration exceeds the PADEP Non-Residential Soil MSC  
**10** - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No     | PADEP Non-Residential Used                          | PADEP Non-Residential Used                           | PADEP Non-Residential         | PADEP Non-Residential Used        | Location ID | BH-10-44         |    |        |       | BH-10-45         |    |        |      | BH-10-46         |    |        |      | BH-10-55         |    |        |      | BH-10-56         |    |        |      | BH-10-63         |    |       |      |
|----------------------------------------|------------|-----------------------------------------------------|------------------------------------------------------|-------------------------------|-----------------------------------|-------------|------------------|----|--------|-------|------------------|----|--------|------|------------------|----|--------|------|------------------|----|--------|------|------------------|----|--------|------|------------------|----|-------|------|
|                                        |            | Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | Direct Contact (0 - 2 ft bgs) | Unsaturated Soil MSCs (TDS<2,500) | Sample ID   | BH-10-44-WC 0-2' |    |        |       | BH-10-45-WC 0-2' |    |        |      | BH-10-46-WC 0-2' |    |        |      | BH-10-55-WC 0-2' |    |        |      | BH-10-56-WC 0-2' |    |        |      | BH-10-63-WC 0-2' |    |       |      |
|                                        |            |                                                     |                                                      |                               |                                   |             | 4/12/2011        |    |        |       | 4/12/2011        |    |        |      | 4/12/2011        |    |        |      | 4/12/2011        |    |        |      | 4/12/2011        |    |        |      | 4/13/2011        |    |       |      |
|                                        |            |                                                     |                                                      |                               |                                   |             | Soil             |    |        |       | Soil             |    |        |      | Soil             |    |        |      | Soil             |    |        |      | Soil             |    |        |      | Soil             |    |       |      |
|                                        |            |                                                     |                                                      |                               |                                   |             | 0-2 ft bgs       |    |        |       | 0-2 ft bgs       |    |        |      | 0-2 ft bgs       |    |        |      | 0-2 ft bgs       |    |        |      | 0-2 ft bgs       |    |        |      | 0-2 ft bgs       |    |       |      |
| Unit                                   | Result     | Q                                                   | RL                                                   | DF                            | Result                            | Q           | RL               | DF | Result | Q     | RL               | DF | Result | Q    | RL               | DF | Result | Q    | RL               | DF | Result | Q    | RL               | DF | Result | Q    | RL               | DF |       |      |
| Volatile Organic Compounds             |            |                                                     |                                                      |                               |                                   |             |                  |    |        |       |                  |    |        |      |                  |    |        |      |                  |    |        |      |                  |    |        |      |                  |    |       |      |
| 1,1,1-Trichloroethane                  | 71-55-6    | 20                                                  | 7.2                                                  | 10000                         | 20                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,1,2,2-Tetrachloroethane              | 79-34-5    | 0.03                                                | 0.0093                                               | 38                            | 0.03                              | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane  | 76-13-1    | 10000                                               | 10000                                                | 10000                         | 10000                             | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| 1,1,2-Trichloroethane                  | 79-00-5    | 0.5                                                 | 0.15                                                 | 140                           | 0.5                               | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,1-Dichloroethane                     | 75-34-3    | 16                                                  | 3.9                                                  | 1400                          | 16                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,1-Dichloroethene                     | 75-35-4    | 0.7                                                 | 0.19                                                 | 10000                         | 0.7                               | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,2,4-Trichlorobenzene                 | 120-82-1   | 7                                                   | 27                                                   | 10000                         | 27                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,2-Dibromo-3-Chloropropane            | 96-12-8    | 0.02                                                | 0.0092                                               | 0.37                          | 0.02                              | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4   | 0.005                                               | 0.0012                                               | 3.7                           | 0.005                             | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,2-Dichlorobenzene                    | 95-50-1    | 60                                                  | 59                                                   | 10000                         | 60                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,2-Dichloroethane                     | 107-06-2   | 0.5                                                 | 0.1                                                  | 86                            | 0.5                               | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,2-Dichloropropane                    | 78-87-5    | 0.5                                                 | 0.11                                                 | 220                           | 0.5                               | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,3-Dichlorobenzene                    | 541-73-1   | 60                                                  | 61                                                   | 8400                          | 61                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 1,4-Dichlorobenzene                    | 106-46-7   | 7.5                                                 | 10                                                   | 200                           | 10                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| 2-Hexanone                             | 591-78-6   | 4.4                                                 | 1.1                                                  | 400                           | 4.4                               | mg/kg       | ND               | U  | 0.16   | 44.95 | ND               | U  | 0.003  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.004  | 0.98 | ND               | U  | 0.004  | 1.02 | ND               | U  | 0.003 | 0.75 |
| Acetone                                | 67-64-1    | 9200                                                | 1000                                                 | 10000                         | 9200                              | mg/kg       | ND               | U  | 0.38   | 44.95 | 0.29             |    | 0.007  | 0.86 | 0.21             |    | 0.006  | 0.68 | 0.093            |    | 0.009  | 0.98 | 0.03             |    | 0.008  | 1.02 | 0.15             |    | 0.006 | 0.75 |
| Benzene                                | 71-43-2    | 0.5                                                 | 0.13                                                 | 290                           | 0.5                               | mg/kg       | 0.033            | J  | 0.027  | 44.95 | 0.019            |    | 5E-04  | 0.86 | 0.012            |    | 4E-04  | 0.68 | 0.035            |    | 6E-04  | 0.98 | 0.016            |    | 6E-04  | 1.02 | 0.006            |    | 4E-04 | 0.75 |
| Bromodichloromethane                   | 75-27-4    | 8                                                   | 2.7                                                  | 60                            | 8                                 | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Bromoform                              | 75-25-2    | 8                                                   | 3.5                                                  | 2000                          | 8                                 | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Bromomethane                           | 74-83-9    | 1                                                   | 0.54                                                 | 400                           | 1                                 | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| Carbon Disulfide                       | 75-15-0    | 620                                                 | 530                                                  | 10000                         | 620                               | mg/kg       | ND               | U  | 0.054  | 44.95 | 0.004            | J  | 0.001  | 0.86 | 0.002            | J  | 8E-04  | 0.68 | 0.004            | J  | 0.001  | 0.98 | 0.002            | J  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Carbon Tetrachloride                   | 56-23-5    | 0.5                                                 | 0.26                                                 | 150                           | 0.5                               | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Chlorobenzene                          | 108-90-7   | 10                                                  | 6.1                                                  | 4000                          | 10                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Chloroethane                           | 75-00-3    | 90                                                  | 19                                                   | 10000                         | 90                                | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| Chloroform                             | 67-66-3    | 8                                                   | 2                                                    | 97                            | 8                                 | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Chloromethane                          | 74-87-3    | 3                                                   | 0.38                                                 | 1200                          | 3                                 | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| Cis-1,2-Dichloroethylene               | 156-59-2   | 7                                                   | 1.6                                                  | 10000                         | 7                                 | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Cis-1,3-Dichloropropene                | 10061-01-5 | NS                                                  | NS                                                   | NS                            | NS                                | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Cyclohexane                            | 110-82-7   | 5300                                                | 6900                                                 | 10000                         | 6900                              | mg/kg       | ND               | U  | 0.054  | 44.95 | 0.002            | J  | 0.001  | 0.86 | 0.014            |    | 8E-04  | 0.68 | 0.003            | J  | 0.001  | 0.98 | 0.001            | J  | 0.001  | 1.02 | 0.001            | J  | 9E-04 | 0.75 |
| Dibromochloromethane                   | 124-48-1   | 8                                                   | 2.5                                                  | 82                            | 8                                 | mg/kg       | ND               | U  | 0.054  | 44.95 | ND               | U  | 0.001  | 0.86 | ND               | U  | 8E-04  | 0.68 | ND               | U  | 0.001  | 0.98 | ND               | U  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Dichlorodifluoromethane                | 75-71-8    | 100                                                 | 100                                                  | 10000                         | 100                               | mg/kg       | ND               | U  | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7  | 1000                                                | 990                                                  | 8000                          | 1000                              | mg/kg       | 0.91             |    | 0.054  | 44.95 | 0.074            |    | 0.001  | 0.86 | 0.12             |    | 8E-04  | 0.68 | 0.034            |    | 0.001  | 0.98 | 0.017            |    | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Ethylbenzene                           | 100-41-4   | 70                                                  | 46                                                   | 10000                         | 70                                | mg/kg       | 0.14             | J  | 0.054  | 44.95 | 0.017            |    | 0.001  | 0.86 | 0.024            |    | 8E-04  | 0.68 | 0.007            |    | 0.001  | 0.98 | 0.003            | J  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Isopropylbenzene (Cumene)              | 98-82-8    | 350                                                 | 2500                                                 | 10000                         | 2500                              | mg/kg       | ND               | U  | 0.054  | 44.95 | 0.005            | J  | 0.001  | 0.86 | 0.005            |    | 8E-04  | 0.68 | 0.003            | J  | 0.001  | 0.98 | 0.001            | J  | 0.001  | 1.02 | ND               | U  | 9E-04 | 0.75 |
| Methyl Acetate                         | 79-20-9    | 10000                                               | 1900                                                 | 10000                         | 10000                             | mg/kg       | 0.46             |    | 0.11   | 44.95 | ND               | U  | 0.002  | 0.86 | ND               | U  | 0.002  | 0.68 | ND               | U  | 0.003  | 0.98 | ND               | U  | 0.002  | 1.02 | ND               | U  | 0.002 | 0.75 |
| Methyl Ethyl Ketone (2-Butanone)       | 78-93-3    | 400                                                 | 76                                                   | 10000                         | 400                               | mg/kg       | ND               | U  | 0.22   | 44.95 | 0.04             |    | 0.004  | 0.86 | 0.029            |    | 0.003  | 0.68 | 0.011            |    |        |      |                  |    |        |      |                  |    |       |      |

Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | BH-10-44         |    |        |   |    | BH-10-45         |        |    |    | BH-10-46         |        |    |      | BH-10-55         |        |   |      | BH-10-56         |        |   |    | BH-10-63         |      |   |  |
|------------------------------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|------------------|----|--------|---|----|------------------|--------|----|----|------------------|--------|----|------|------------------|--------|---|------|------------------|--------|---|----|------------------|------|---|--|
|                                                |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample ID       | BH-10-44-WC 0-2' |    |        |   |    | BH-10-45-WC 0-2' |        |    |    | BH-10-46-WC 0-2' |        |    |      | BH-10-55-WC 0-2' |        |   |      | BH-10-56-WC 0-2' |        |   |    | BH-10-63-WC 0-2' |      |   |  |
|                                                |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Date     | 4/12/2011        |    |        |   |    | 4/12/2011        |        |    |    | 4/12/2011        |        |    |      | 4/12/2011        |        |   |      | 4/12/2011        |        |   |    | 4/13/2011        |      |   |  |
|                                                |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Matrix   | Soil             |    |        |   |    | Soil             |        |    |    | Soil             |        |    |      | Soil             |        |   |      | Soil             |        |   |    | Soil             |      |   |  |
|                                                |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Interval | 0-2 ft bgs       |    |        |   |    | 0-2 ft bgs       |        |    |    | 0-2 ft bgs       |        |    |      | 0-2 ft bgs       |        |   |      | 0-2 ft bgs       |        |   |    | 0-2 ft bgs       |      |   |  |
| Unit                                           | Result    | Q                                                                                       | RL                                                                                       | DF                                                        | Result                                                                           | Q               | RL               | DF | Result | Q | RL | DF               | Result | Q  | RL | DF               | Result | Q  | RL   | DF               | Result | Q | RL   | DF               | Result | Q | RL | DF               |      |   |  |
| Semi-Volatile Organic Compounds                |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |                  |    |        |   |    |                  |        |    |    |                  |        |    |      |                  |        |   |      |                  |        |   |    |                  |      |   |  |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                                    | 6100                                                                                     | 190000                                                    | 6100                                                                             | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                                      | 29                                                                                       | 2800                                                      | 29                                                                               | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                                       | 1                                                                                        | 8400                                                      | 2                                                                                | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                                     | 87                                                                                       | 10000                                                     | 200                                                                              | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                                      | 2.3                                                                                      | 5600                                                      | 20                                                                               | mg/kg           | ND               | U  | 0.4    | 1 | ND | U                | 4      | 10 | ND | U                | 3.8    | 10 | ND   | U                | 2.1    | 5 | ND   | U                | 1.9    | 5 | ND | U                | 1.9  | 5 |  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                                    | 0.2                                                                                      | 260                                                       | 0.84                                                                             | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                                      | 3                                                                                        | 2800                                                      | 10                                                                               | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                                     | 18000                                                                                    | 190000                                                    | 18000                                                                            | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                                       | 4.4                                                                                      | 10000                                                     | 4.4                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                                      | 1600                                                                                     | 11000                                                     | 1600                                                                             | mg/kg           | 2.1              |    | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.92 | J                | 0.21   | 5 | 0.52 | J                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                                     | 85                                                                                       | 140000                                                    | 510                                                                              | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                                      | 5.5                                                                                      | 8400                                                      | 31                                                                               | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                                      | 17                                                                                       | 22000                                                     | 82                                                                               | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                                    | 32                                                                                       | 180                                                       | 32                                                                               | mg/kg           | ND               | U  | 0.12   | 1 | ND | U                | 1.2    | 10 | ND | U                | 1.1    | 10 | ND   | U                | 0.63   | 5 | ND   | U                | 0.58   | 5 | ND | U                | 0.57 | 5 |  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                                     | 0.48                                                                                     | 840                                                       | 3.1                                                                              | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                                       | 0.75                                                                                     | 280                                                       | 1                                                                                | mg/kg           | ND               | U  | 0.2    | 1 | ND | U                | 2      | 10 | ND | U                | 1.9    | 10 | ND   | U                | 1.1    | 5 | ND   | U                | 0.97   | 5 | ND | U                | 0.95 | 5 |  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                                     | NS                                                                                       | 100                                                       | 0.5                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                                      | 110                                                                                      | 14000                                                     | 110                                                                              | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                                     | 1.6                                                                                      | 400                                                       | 1.6                                                                              | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                                     | NS                                                                                       | 100                                                       | 0.5                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                                      | 12                                                                                       | 14000                                                     | 51                                                                               | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                                      | 1.9                                                                                      | 4000                                                      | 13                                                                               | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                                       | 4.1                                                                                      | 22000                                                     | 6                                                                                | mg/kg           | ND               | U  | 0.2    | 1 | ND | U                | 2      | 10 | ND | U                | 1.9    | 10 | ND   | U                | 1.1    | 5 | ND   | U                | 0.97   | 5 | ND | U                | 0.95 | 5 |  |
| Acenaphthene                                   | 83-32-9   | 380                                                                                     | 4700                                                                                     | 170000                                                    | 4700                                                                             | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                                     | 6900                                                                                     | 170000                                                    | 6900                                                                             | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Acetophenone                                   | 98-86-2   | 1000                                                                                    | 540                                                                                      | 10000                                                     | 1000                                                                             | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| Anthracene                                     | 120-12-7  | 6.6                                                                                     | 350                                                                                      | 190000                                                    | 350                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.25 | J                | 0.21   | 5 | 0.25 | J                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                                     | 0.13                                                                                     | 340                                                       | 0.3                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                                    | 320                                                                                      | 110                                                       | 110                                                                              | mg/kg           | 0.069            | J  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.68 | J                | 0.21   | 5 | 1.2  |                  | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                                    | 46                                                                                       | 11                                                        | 11                                                                               | mg/kg           | 0.18             | J  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.82 | J                | 0.21   | 5 | 1.6  |                  | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                                    | 170                                                                                      | 110                                                       | 110                                                                              | mg/kg           | 0.085            | J  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 1.2  |                  | 0.21   | 5 | 2.1  |                  | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                                   | 180                                                                                      | 170000                                                    | 180                                                                              | mg/kg           | 0.042            | J  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.99 | J                | 0.21   | 5 | 1.5  |                  | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                                   | 610                                                                                      | 1100                                                      | 610                                                                              | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | 0.4  | J                | 0.21   | 5 | 0.76 | J                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                                     | 10000                                                                                    | 10000                                                     | 10000                                                                            | mg/kg           | ND               | U  | 0.079  | 1 | ND | U                | 0.81   | 10 | ND | U                | 0.76   | 10 | ND   | U                | 0.42   | 5 | ND   | U                | 0.39   | 5 | ND | U                | 0.38 | 5 |  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                                     | 2200                                                                                     | 140000                                                    | 2200                                                                             | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                                      | 8.2                                                                                      | 8400                                                      | 31                                                                               | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                                   | 0.023                                                                                    | 6.7                                                       | 0.076                                                                            | mg/kg           | ND               | U  | 0.04   | 1 | ND | U                | 0.4    | 10 | ND | U                | 0.38   | 10 | ND   | U                | 0.21   | 5 | ND   | U                | 0.19   | 5 | ND | U                | 0.19 | 5 |  |
| B                                              |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |                  |    |        |   |    |                  |        |    |    |                  |        |    |      |                  |        |   |      |                  |        |   |    |                  |      |   |  |

Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID<br>Sample ID | BH-10-44<br>BH-10-44-WC_ 0-2' |   |             |    | BH-10-45<br>BH-10-45-WC_ 0-2' |   |            |    | BH-10-46<br>BH-10-46-WC_ 0-2' |   |             |    | BH-10-55<br>BH-10-55-WC_ 0-2' |   |             |    | BH-10-56<br>BH-10-56-WC_ 0-2' |   |             |    | BH-10-63<br>BH-10-63-WC_ 0-2' |   |             |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|--------------------------|-------------------------------|---|-------------|----|-------------------------------|---|------------|----|-------------------------------|---|-------------|----|-------------------------------|---|-------------|----|-------------------------------|---|-------------|----|-------------------------------|---|-------------|----|
|                           |           | 100xGW MSCs (TDS<2,500)                                                        | Generic MSCs (TDS<2,500)                                                        | Direct Contact (0 - 2 ft bgs)                       | Unsaturated Soil MSCs (TDS<2,500)                                    | Sample Date              | 4/12/2011                     |   |             |    | 4/12/2011                     |   |            |    | 4/12/2011                     |   |             |    | 4/12/2011                     |   |             |    | 4/12/2011                     |   |             |    | 4/13/2011                     |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix            | Soil                          |   |             |    | Soil                          |   |            |    | Soil                          |   |             |    | Soil                          |   |             |    | Soil                          |   |             |    | Soil                          |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval          | 0-2 ft bgs                    |   |             |    | 0-2 ft bgs                    |   |            |    | 0-2 ft bgs                    |   |             |    | 0-2 ft bgs                    |   |             |    | 0-2 ft bgs                    |   |             |    | 0-2 ft bgs                    |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit                     | Result                        | Q | RL          | DF | Result                        | Q | RL         | DF | Result                        | Q | RL          | DF | Result                        | Q | RL          | DF | Result                        | Q | RL          | DF | Result                        | Q | RL          | DF |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 50                                                  | 0.96                                                                 | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 1000                                                | 39                                                                   | mg/kg                    | ND                            | U | 0.079       | 1  | ND                            | U | 0.81       | 10 | ND                            | U | 0.76        | 10 | ND                            | U | 0.42        | 5  | ND                            | U | 0.39        | 5  | ND                            | U | 0.38        | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 10000                                               | 91                                                                   | mg/kg                    | ND                            | U | 0.2         | 1  | ND                            | U | 2          | 10 | ND                            | U | 1.9         | 10 | ND                            | U | 1.1         | 5  | ND                            | U | 0.97        | 5  | ND                            | U | 0.95        | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 550                                                 | 0.56                                                                 | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 110                                                 | 110                                                                  | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | 0.66                          | J | 0.21        | 5  | 1.1                           |   | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 10000                                               | 10                                                                   | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg                    | 0.88                          |   | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | 0.56                          | J | 0.21        | 5  | 0.45                          | J | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 5600                                                | 20                                                                   | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 11                                                  | 0.037                                                                | mg/kg                    | ND                            | U | <b>0.04</b> | 1  | ND                            | U | <b>0.4</b> | 10 | ND                            | U | <b>0.38</b> | 10 | ND                            | U | <b>0.21</b> | 5  | ND                            | U | <b>0.19</b> | 5  | ND                            | U | <b>0.19</b> | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 16000                                               | 83                                                                   | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 660                                                 | 5                                                                    | mg/kg                    | ND                            | U | 0.2         | 1  | ND                            | U | 2          | 10 | ND                            | U | 1.9         | 10 | ND                            | U | 1.1         | 5  | ND                            | U | 0.97        | 5  | ND                            | U | 0.95        | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg                    | 0.26                          |   | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | 0.87                          | J | 0.21        | 5  | 0.93                          | J | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 190000                                              | 200                                                                  | mg/kg                    | ND                            | U | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | ND                            | U | 0.21        | 5  | ND                            | U | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg                    | 0.13                          | J | 0.04        | 1  | ND                            | U | 0.4        | 10 | ND                            | U | 0.38        | 10 | 0.9                           | J | 0.21        | 5  | 1.4                           |   | 0.19        | 5  | ND                            | U | 0.19        | 5  |
| Metals                    |           |                                                                                |                                                                                 |                                                     |                                                                      |                          |                               |   |             |    |                               |   |            |    |                               |   |             |    |                               |   |             |    |                               |   |             |    |                               |   |             |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | 190000                                              | 190000                                                               | mg/kg                    | 19400                         |   | 5.86        | 1  | 11200                         |   | 5.83       | 1  | 24600                         |   | 5.54        | 1  | 12500                         |   | 6.25        | 1  | 14900                         |   | 5.95        | 1  | 13000                         |   | 5.76        | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 1100                                                | 27                                                                   | mg/kg                    | ND                            | U | 1.16        | 1  | ND                            | U | 1.16       | 1  | ND                            | U | 1.1         | 1  | ND                            | U | 1.24        | 1  | ND                            | U | 1.18        | 1  | ND                            | U | 1.15        | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 53                                                  | 29                                                                   | mg/kg                    | 6.77                          |   | 1.11        | 1  | 6.94                          |   | 1.1        | 1  | 8.36                          |   | 1.05        | 1  | 17.1                          |   | 1.18        | 1  | 9.44                          |   | 1.12        | 1  | 6.21                          |   | 1.09        | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 190000                                              | 8200                                                                 | mg/kg                    | 122                           |   | 0.047       | 1  | 75.7                          |   | 0.046      | 1  | 103                           |   | 0.044       | 1  | 108                           |   | 0.05        | 1  | 100                           |   | 0.047       | 1  | 49.5                          |   | 0.046       | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 5600                                                | 320                                                                  | mg/kg                    | 2.4                           |   | 0.079       | 1  | 0.523                         | J | 0.079      | 1  | 1.4                           |   | 0.075       | 1  | 0.645                         |   | 0.085       | 1  | 0.796                         |   | 0.08        | 1  | 0.55                          | J | 0.078       | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 1400                                                | 38                                                                   | mg/kg                    | ND                            | U | 0.163       | 1  | ND                            | U | 0.162      | 1  | ND                            | U | 0.154       | 1  | 0.557                         | J | 0.174       | 1  | ND                            | U | 0.165       | 1  | ND                            | U | 0.16        | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg                    | 34500                         |   | 7.14        | 1  | 37300                         |   | 7.1        | 1  | 13100                         |   | 6.75        | 1  | 71000                         |   | 38.1        | 5  | 18400                         |   | 7.25        | 1  | 962                           |   | 7.02        | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg                    | 19.3                          |   | 0.687       | 1  | 32.3                          |   | 0.684      | 1  | 45.3                          |   | 0.65        | 1  | 254                           |   | 0.733       | 1  | 93.1                          |   | 0.697       | 1  | 21                            |   | 0.676       | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 840                                                 | 140                                                                  | mg/kg                    | 11.7                          |   | 0.221       | 1  | 8.02                          |   | 0.22       | 1  | 11.8                          |   | 0.209       | 1  | 7.77                          |   | 0.236       | 1  | 6.74                          |   | 0.225       | 1  | 7.43                          |   | 0.218       | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 100000                                              | 43000                                                                | mg/kg                    | 33.2                          |   | 0.256       | 1  | 48.8                          |   | 0.255      | 1  | 37.1                          |   | 0.242       | 1  | 545                           |   | 0.273       | 1  | 58.8                          |   | 0.26        | 1  | 20.4                          |   | 0.252       | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | 190000                                              | 190000                                                               | mg/kg                    | 41000                         |   | 27.4        | 5  | 14700                         |   | 5.46       | 1  | 34100                         |   | 25.9        | 5  | 21300                         |   | 5.86        | 1  | 19900                         |   | 5.57        | 1  | 18700                         |   | 5.4         | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg                    | 22.3                          |   | 0.698       | 1  | 96.7                          |   | 0.695      | 1  | 48.5                          |   | 0.661       | 1  | 953                           |   | 0.746       | 1  | 86.4                          |   | 0.709       | 1  | 25.2                          |   | 0.687       | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg                    | 17200                         |   | 2.96        | 1  | 22200                         |   | 2.94       | 1  | 8710                          |   | 2.8         | 1  | 32500                         |   | 3.16        | 1  | 7330                          |   | 3           | 1  | 2500                          |   | 2.91        | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 130000                                              | 2000                                                                 | mg/kg                    | 2040                          |   | 0.454       | 5  | 396                           |   | 0.09       | 1  | 861                           |   | 0.086       | 1  | 479                           |   | 0.097       | 1  | 242                           |   | 0.092       | 1  | 302                           |   | 0.089       | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 450                                                 | 10                                                                   | mg/kg                    | 0.0693                        | J | 0.003       | 1  | 0.267                         |   | 0.003      | 1  | 0.054                         | J | 0.003       | 1  | 2.32                          |   | 0.018       | 5  | 0.153                         |   | 0.003       | 1  | 0.072                         | J | 0.003       | 1  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 56000                                               | 650                                                                  | mg/kg                    | 25.8                          |   | 0.221       | 1  | 16.1                          |   | 0.22       | 1  | 27.3                          |   | 0.209       | 1  | 39.1                          |   | 0.236       | 1  | 23.5                          |   | 0.225       | 1  | 14.4                          |   | 0.218       | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg                    | 1230                          |   | 21          | 1  | 904                           |   | 20.9       | 1  | 1350                          |   | 19.8        | 1  | 1040                          |   | 22.4        | 1  | 1540                          |   | 21.3        | 1  | 1240                          |   | 20.6        | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 14000                                               | 26                                                                   | mg/kg                    | ND                            | U | 1.14        | 1  | ND                            | U | 1.14       | 1  | ND                            | U | 1.08        | 1  | 1.57                          | J | 1.22        | 1  | ND                            | U | 1.16        | 1  | ND                            | U | 1.12        | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 14000                                               | 84                                                                   | mg/kg                    | ND                            | U | 0.21        | 1  | ND                            | U | 0.209      | 1  | ND                            | U | 0.198       | 1  | 0.286                         | J | 0.224       | 1  | ND                            | U | 0.213       | 1  | ND                            | U | 0.206       | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg                    | 80                            | J | 43.4        | 1  | 61.2                          | J | 43.2       | 1  | 72.1                          | J | 41.1        | 1  | 142                           |   | 46.4        | 1  | 142                           |   | 44.1        | 1  | 51.2                          | J | 42.7        | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 200                                                 | 14                                                                   | mg/kg                    | ND                            | U | 1.69        | 1  | ND                            | U | 1.68       | 1  | ND                            | U | 1.6         | 1  | 5.11                          |   | 1.8         | 1  | 3.51                          | J | 1.71        | 1  | ND                            | U | 1.66        | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 20000                                               | 20000                                                                | mg/kg                    | 40.5                          |   | 0.221       | 1  | 35.6                          |   | 0.22       | 1  | 50.3                          |   | 0.209       | 1  | 100                           |   | 0.236       | 1  | 58.6                          |   | 0.225       | 1  | 26.5                          |   | 0.218       | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 190000                                              | 12000                                                                | mg/kg                    | 88.1                          |   | 0.768       | 1  | 70.8                          |   | 0.765      | 1  | 67.7                          |   | 0.727       | 1  | 427                           |   | 0.82        | 1  | 106                           |   | 0.78        | 1  | 55.4                          |   | 0.756       | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                     |                                                                      |                          |                               |   |             |    |                               |   |            |    |                               |   |             |    |                               |   |             |    |                               |   |             |    |                               |   |             |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | %                        | 16.6                          |   | 0.5         | 1  | 17.8                          |   | 0.5        | 1  | 13.5                          |   | 0.5         | 1  | 21.9                          |   | 0.5         | 1  | 15.4                          |   | 0.5         | 1  | 12.7                          |   | 0.5         | 1  |

Notes:  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

Qualifiers:  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

Exceedance Summary:  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration Exceeds the PADEP Non-Residential Direct Contact Standard

Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                 | CAS No     | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | BH-10-64         |   |       |      | BH-10-69         |   |       |      | BH-10-70          |   |       |      | BH-10-77         |   |       |      |
|-----------------------------------------------|------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|------------------|---|-------|------|------------------|---|-------|------|-------------------|---|-------|------|------------------|---|-------|------|
|                                               |            |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample ID       | BH-10-64-WC 0-2' |   |       |      | BH-10-69-WC 0-2' |   |       |      | BH-10-70-WC@0'-2' |   |       |      | BH-10-77-WC 0-2' |   |       |      |
|                                               |            |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Date     | 4/13/2011        |   |       |      | 4/12/2011        |   |       |      | 4/11/2011         |   |       |      | 4/13/2011        |   |       |      |
|                                               |            |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Matrix   | Soil             |   |       |      | Soil             |   |       |      | Soil              |   |       |      | Soil             |   |       |      |
|                                               |            |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Interval | 0-2 ft bgs       |   |       |      | 0-2 ft bgs       |   |       |      | 0-2 ft bgs        |   |       |      | 0-2 ft bgs       |   |       |      |
|                                               |            |                                                                                         |                                                                                          |                                                           |                                                                                  | Unit            | Result           | Q | RL    | DF   | Result           | Q | RL    | DF   | Result            | Q | RL    | DF   | Result           | Q | RL    | DF   |
| Volatile Organic Compounds                    |            |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |                  |   |       |      |                  |   |       |      |                   |   |       |      |                  |   |       |      |
| 1,1,1-Trichloroethane                         | 71-55-6    | 20                                                                                      | 7.2                                                                                      | 10000                                                     | 20                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,1,2,2-Tetrachloroethane                     | 79-34-5    | 0.03                                                                                    | 0.0093                                                                                   | 38                                                        | 0.03                                                                             | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane         | 76-13-1    | 10000                                                                                   | 10000                                                                                    | 10000                                                     | 10000                                                                            | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| 1,1,2-Trichloroethane                         | 79-00-5    | 0.5                                                                                     | 0.15                                                                                     | 140                                                       | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,1-Dichloroethane                            | 75-34-3    | 16                                                                                      | 3.9                                                                                      | 1400                                                      | 16                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,1-Dichloroethene                            | 75-35-4    | 0.7                                                                                     | 0.19                                                                                     | 10000                                                     | 0.7                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,2,4-Trichlorobenzene                        | 120-82-1   | 7                                                                                       | 27                                                                                       | 10000                                                     | 27                                                                               | mg/kg           | 0.001            | J | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,2-Dibromo-3-Chloropropane                   | 96-12-8    | 0.02                                                                                    | 0.0092                                                                                   | 0.37                                                      | 0.02                                                                             | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| 1,2-Dibromoethane (Ethylene Dibromide)        | 106-93-4   | 0.005                                                                                   | 0.0012                                                                                   | 3.7                                                       | 0.005                                                                            | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,2-Dichlorobenzene                           | 95-50-1    | 60                                                                                      | 59                                                                                       | 10000                                                     | 60                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,2-Dichloroethane                            | 107-06-2   | 0.5                                                                                     | 0.1                                                                                      | 86                                                        | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,2-Dichloropropane                           | 78-87-5    | 0.5                                                                                     | 0.11                                                                                     | 220                                                       | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,3-Dichlorobenzene                           | 541-73-1   | 60                                                                                      | 61                                                                                       | 8400                                                      | 61                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 1,4-Dichlorobenzene                           | 106-46-7   | 7.5                                                                                     | 10                                                                                       | 200                                                       | 10                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| 2-Hexanone                                    | 591-78-6   | 4.4                                                                                     | 1.1                                                                                      | 400                                                       | 4.4                                                                              | mg/kg           | ND               | U | 0.004 | 1.01 | ND               | U | 0.004 | 1.02 | ND                | U | 0.003 | 0.81 | ND               | U | 0.003 | 0.74 |
| Acetone                                       | 67-64-1    | 9200                                                                                    | 1000                                                                                     | 10000                                                     | 9200                                                                             | mg/kg           | 0.31             |   | 0.008 | 1.01 | 0.081            |   | 0.008 | 1.02 | 0.057             |   | 0.007 | 0.81 | 0.082            |   | 0.006 | 0.74 |
| Benzene                                       | 71-43-2    | 0.5                                                                                     | 0.13                                                                                     | 290                                                       | 0.5                                                                              | mg/kg           | 0.15             |   | 6E-04 | 1.01 | 0.004            | J | 6E-04 | 1.02 | ND                | U | 5E-04 | 0.81 | 0.002            | J | 4E-04 | 0.74 |
| Bromodichloromethane                          | 75-27-4    | 8                                                                                       | 2.7                                                                                      | 60                                                        | 8                                                                                | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Bromoform                                     | 75-25-2    | 8                                                                                       | 3.5                                                                                      | 2000                                                      | 8                                                                                | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Bromomethane                                  | 74-83-9    | 1                                                                                       | 0.54                                                                                     | 400                                                       | 1                                                                                | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Carbon Disulfide                              | 75-15-0    | 620                                                                                     | 530                                                                                      | 10000                                                     | 620                                                                              | mg/kg           | 0.003            | J | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | 0.001             | J | 9E-04 | 0.81 | 0.001            | J | 9E-04 | 0.74 |
| Carbon Tetrachloride                          | 56-23-5    | 0.5                                                                                     | 0.26                                                                                     | 150                                                       | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Chlorobenzene                                 | 108-90-7   | 10                                                                                      | 6.1                                                                                      | 4000                                                      | 10                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Chloroethane                                  | 75-00-3    | 90                                                                                      | 19                                                                                       | 10000                                                     | 90                                                                               | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Chloroform                                    | 67-66-3    | 8                                                                                       | 2                                                                                        | 97                                                        | 8                                                                                | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Chloromethane                                 | 74-87-3    | 3                                                                                       | 0.38                                                                                     | 1200                                                      | 3                                                                                | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Cis-1,2-Dichloroethylene                      | 156-59-2   | 7                                                                                       | 1.6                                                                                      | 10000                                                     | 7                                                                                | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Cis-1,3-Dichloropropene                       | 10061-01-5 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Cyclohexane                                   | 110-82-7   | 5300                                                                                    | 6900                                                                                     | 10000                                                     | 6900                                                                             | mg/kg           | 0.039            |   | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Dibromochloromethane                          | 124-48-1   | 8                                                                                       | 2.5                                                                                      | 82                                                        | 8                                                                                | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Dichlorodifluoromethane                       | 75-71-8    | 100                                                                                     | 100                                                                                      | 10000                                                     | 100                                                                              | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Dimethyl Benzene/ Xylenes, Total              | 1330-20-7  | 1000                                                                                    | 990                                                                                      | 8000                                                      | 1000                                                                             | mg/kg           | 0.043            |   | 0.001 | 1.01 | 0.016            |   | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Ethylbenzene                                  | 100-41-4   | 70                                                                                      | 46                                                                                       | 10000                                                     | 70                                                                               | mg/kg           | 0.021            |   | 0.001 | 1.01 | 0.003            | J | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Isopropylbenzene (Cumene)                     | 98-82-8    | 350                                                                                     | 2500                                                                                     | 10000                                                     | 2500                                                                             | mg/kg           | 0.019            |   | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Methyl Acetate                                | 79-20-9    | 10000                                                                                   | 1900                                                                                     | 10000                                                     | 10000                                                                            | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Methyl Ethyl Ketone (2-Butanone)              | 78-93-3    | 400                                                                                     | 76                                                                                       | 10000                                                     | 400                                                                              | mg/kg           | 0.026            |   | 0.005 | 1.01 | ND               | U | 0.005 | 1.02 | ND                | U | 0.004 | 0.81 | 0.008            | J | 0.004 | 0.74 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 108-10-1   | 820                                                                                     | 130                                                                                      | 10000                                                     | 820                                                                              | mg/kg           | ND               | U | 0.004 | 1.01 | ND               | U | 0.004 | 1.02 | ND                | U | 0.003 | 0.81 | ND               | U | 0.003 | 0.74 |
| Methylcyclohexane                             | 108-87-2   | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 0.099            |   | 0.001 | 1.01 | 0.003            | J | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | 0.0009           | J | 9E-04 | 0.74 |
| Methylene Chloride                            | 75-09-2    | 0.5                                                                                     | 0.076                                                                                    | 4700                                                      | 0.5                                                                              | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Styrene                                       | 100-42-5   | 10                                                                                      | 24                                                                                       | 10000                                                     | 24                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Tert-Butyl Methyl Ether                       | 1634-04-4  | 2                                                                                       | 0.28                                                                                     | 3200                                                      | 2                                                                                | mg/kg           | ND               | U | 6E-04 | 1.01 | ND               | U | 6E-04 | 1.02 | ND                | U | 5E-04 | 0.81 | ND               | U | 4E-04 | 0.74 |
| Tetrachloroethylene(PCE)                      | 127-18-4   | 0.5                                                                                     | 0.43                                                                                     | 1500                                                      | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Toluene                                       | 108-88-3   | 100                                                                                     | 44                                                                                       | 10000                                                     | 100                                                                              | mg/kg           | 0.013            |   | 0.001 | 1.01 | 0.017            |   | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Trans-1,2-Dichloroethene                      | 156-60-5   | 10                                                                                      | 2.3                                                                                      | 4800                                                      | 10                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Trans-1,3-Dichloropropene                     | 10061-02-6 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Trichloroethylene (TCE)                       | 79-01-6    | 0.5                                                                                     | 0.17                                                                                     | 1300                                                      | 0.5                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |
| Trichlorofluoromethane                        | 75-69-4    | 200                                                                                     | 87                                                                                       | 10000                                                     | 200                                                                              | mg/kg           | ND               | U | 0.002 | 1.01 | ND               | U | 0.002 | 1.02 | ND                | U | 0.002 | 0.81 | ND               | U | 0.002 | 0.74 |
| Vinyl Chloride                                | 75-01-4    | 0.2                                                                                     | 0.027                                                                                    | 110                                                       | 0.2                                                                              | mg/kg           | ND               | U | 0.001 | 1.01 | ND               | U | 0.001 | 1.02 | ND                | U | 9E-04 | 0.81 | ND               | U | 9E-04 | 0.74 |



Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-64         |   |     |    | BH-10-69         |   |       |    | BH-10-70          |   |       |    | BH-10-77         |   |     |    |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|------------------|---|-----|----|------------------|---|-------|----|-------------------|---|-------|----|------------------|---|-----|----|
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | BH-10-64-WC_0-2' |   |     |    | BH-10-69-WC_0-2' |   |       |    | BH-10-70-WC@0'-2' |   |       |    | BH-10-77-WC_0-2' |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/13/2011        |   |     |    | 4/12/2011        |   |       |    | 4/11/2011         |   |       |    | 4/13/2011        |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil             |   |     |    | Soil             |   |       |    | Soil              |   |       |    | Soil             |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | 0-2 ft bgs       |   |     |    | 0-2 ft bgs       |   |       |    | 0-2 ft bgs        |   |       |    | 0-2 ft bgs       |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result           | Q | RL  | DF | Result           | Q | RL    | DF | Result            | Q | RL    | DF | Result           | Q | RL  | DF |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |                  |   |     |    |                  |   |       |    |                   |   |       |    |                  |   |     |    |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 190000                                              | 6100                                                                 | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2800                                                | 29                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 8400                                                | 2                                                                    | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 10000                                               | 200                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 5600                                                | 20                                                                   | mg/kg           | ND               | U | 20  | 5  | ND               | U | 0.39  | 1  | ND                | U | 0.39  | 1  | ND               | U | 2   | 5  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 260                                                 | 0.84                                                                 | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 2800                                                | 10                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 190000                                              | 18000                                                                | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 10000                                               | 4.4                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 11000                                               | 1600                                                                 | mg/kg           | ND               | U | 2   | 5  | 0.085            | J | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.23             | J | 0.2 | 5  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 140000                                              | 510                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 22000                                               | 82                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 180                                                 | 32                                                                   | mg/kg           | ND               | U | 5.9 | 5  | ND               | U | 0.12  | 1  | ND                | U | 0.12  | 1  | ND               | U | 0.6 | 5  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 840                                                 | 3.1                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 280                                                 | 1                                                                    | mg/kg           | ND               | U | 9.8 | 5  | ND               | U | 0.2   | 1  | ND                | U | 0.19  | 1  | ND               | U | 1   | 5  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 14000                                               | 110                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 400                                                 | 1.6                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 14000                                               | 51                                                                   | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 4000                                                | 13                                                                   | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 22000                                               | 6                                                                    | mg/kg           | ND               | U | 9.8 | 5  | ND               | U | 0.2   | 1  | ND                | U | 0.19  | 1  | ND               | U | 1   | 5  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 170000                                              | 4700                                                                 | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.27             | J | 0.2 | 5  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 170000                                              | 6900                                                                 | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 10000                                               | 1000                                                                 | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.52             | J | 0.2 | 5  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 340                                                 | 0.3                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 41               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 2                |   | 0.2 | 5  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 120              |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 1.9              |   | 0.2 | 5  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 54               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 2.5              |   | 0.2 | 5  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 96               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 1.5              |   | 0.2 | 5  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 1100                                                | 610                                                                  | mg/kg           | 10               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 1.1              |   | 0.2 | 5  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 140000                                              | 2200                                                                 | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 8400                                                | 31                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 6.7                                                 | 0.076                                                                | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 220                                                 | 30                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Bis(2-Ethylhexyl) Phthalate                    | 117-81-7  | 0.6                                                                            | 130                                                                             | 5700                                                | 130                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | 0.36              | J | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Caprolactam                                    | 105-60-2  | NS                                                                             | NS                                                                              | NS                                                  | NS                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Carbazole                                      | 86-74-8   | 13                                                                             | 83                                                                              | 4000                                                | 83                                                                   | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.38             | J | 0.2 | 5  |
| Chrysene                                       | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 83               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 2                |   | 0.2 | 5  |
| Dibenz(A,H)Anthracene                          | 53-70-3   | 0.036                                                                          | 160                                                                             | 11                                                  | 11                                                                   | mg/kg           | 73               |   | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.53             | J | 0.2 | 5  |
| Dibenzofuran                                   | 132-64-9  | 10                                                                             | 260                                                                             | 2800                                                | 260                                                                  | mg/kg           | ND               | U | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2 | 5  |
| Diethyl Phthalate                              | 84-66-2   | 8200                                                                           | 2600                                                                            | 10000                                               | 8200                                                                 | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Dimethyl Phthalate                             | 131-11-3  | 0.5                                                                            | NS                                                                              | 100                                                 | 0.5                                                                  | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Di-N-Butyl Phthalate                           | 84-74-2   | 1000                                                                           | 4100                                                                            | 10000                                               | 4100                                                                 | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Di-N-Octylphthalate                            | 117-84-0  | 300                                                                            | 10000                                                                           | 10000                                               | 10000                                                                | mg/kg           | ND               | U | 3.9 | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4 | 5  |
| Fluoranthene                                   | 206-44-0  | 26                                                                             | 3200                                                                            | 110000                                              | 3200                                                                 | mg/kg           | 2.2              | J | 2   | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 3.7              |   | 0.2 | 5  |

Table 6  
Summary of Shallow Soil Sample Analytical Results:  
CAMU Area Soil Samples  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | BH-10-64         |   |       |    | BH-10-69         |   |       |    | BH-10-70          |   |       |    | BH-10-77         |   |       |    |
|---------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|------------------|---|-------|----|------------------|---|-------|----|-------------------|---|-------|----|------------------|---|-------|----|
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample ID       | BH-10-64-WC 0-2' |   |       |    | BH-10-69-WC 0-2' |   |       |    | BH-10-70-WC@0'-2' |   |       |    | BH-10-77-WC 0-2' |   |       |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Date     | 4/13/2011        |   |       |    | 4/12/2011        |   |       |    | 4/11/2011         |   |       |    | 4/13/2011        |   |       |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Matrix   | Soil             |   |       |    | Soil             |   |       |    | Soil              |   |       |    | Soil             |   |       |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Sample Interval | 0-2 ft bgs       |   |       |    | 0-2 ft bgs       |   |       |    | 0-2 ft bgs        |   |       |    | 0-2 ft bgs       |   |       |    |
|                           |           |                                                                                         |                                                                                          |                                                           |                                                                                  | Unit            | Result           | Q | RL    | DF | Result           | Q | RL    | DF | Result            | Q | RL    | DF | Result           | Q | RL    | DF |
| Fluorene                  | 86-73-7   | 190                                                                                     | 3800                                                                                     | 110000                                                    | 3800                                                                             | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.22             | J | 0.2   | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                                     | 0.96                                                                                     | 50                                                        | 0.96                                                                             | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                                     | 39                                                                                       | 1000                                                      | 39                                                                               | mg/kg           | ND               | U | 3.9   | 5  | ND               | U | 0.079 | 1  | ND                | U | 0.077 | 1  | ND               | U | 0.4   | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                                       | 91                                                                                       | 10000                                                     | 91                                                                               | mg/kg           | ND               | U | 9.8   | 5  | ND               | U | 0.2   | 1  | ND                | U | 0.19  | 1  | ND               | U | 1     | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                                     | 0.56                                                                                     | 550                                                       | 0.56                                                                             | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                                    | 28000                                                                                    | 110                                                       | 110                                                                              | mg/kg           | 59               |   | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 1.3              |   | 0.2   | 5  |
| Isophorone                | 78-59-1   | 10                                                                                      | 1.9                                                                                      | 10000                                                     | 10                                                                               | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| Naphthalene               | 91-20-3   | 10                                                                                      | 25                                                                                       | 56000                                                     | 25                                                                               | mg/kg           | ND               | U | 2     | 5  | 0.055            | J | 0.039 | 1  | ND                | U | 0.039 | 1  | 0.24             | J | 0.2   | 5  |
| Nitrobenzene              | 98-95-3   | 20                                                                                      | 8.7                                                                                      | 5600                                                      | 20                                                                               | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                                   | 0.0051                                                                                   | 11                                                        | 0.037                                                                            | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                                      | 83                                                                                       | 16000                                                     | 83                                                                               | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                                     | 5                                                                                        | 660                                                       | 5                                                                                | mg/kg           | ND               | U | 9.8   | 5  | ND               | U | 0.2   | 1  | ND                | U | 0.19  | 1  | ND               | U | 1     | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                                     | 10000                                                                                    | 190000                                                    | 10000                                                                            | mg/kg           | 2.1              | J | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 2.7              |   | 0.2   | 5  |
| Phenol                    | 108-95-2  | 200                                                                                     | 33                                                                                       | 190000                                                    | 200                                                                              | mg/kg           | ND               | U | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | ND               | U | 0.2   | 5  |
| Pyrene                    | 129-00-0  | 13                                                                                      | 2200                                                                                     | 84000                                                     | 2200                                                                             | mg/kg           | 8.4              | J | 2     | 5  | ND               | U | 0.039 | 1  | ND                | U | 0.039 | 1  | 3.2              |   | 0.2   | 5  |
| Metals                    |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |                  |   |       |    |                  |   |       |    |                   |   |       |    |                  |   |       |    |
| Aluminum                  | 7429-90-5 | NS                                                                                      | NS                                                                                       | 190000                                                    | 190000                                                                           | mg/kg           | 10200            |   | 5.7   | 1  | 17000            |   | 5.7   | 1  | 102000            |   | 29.3  | 5  | 16700            |   | 5.91  | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                                     | 27                                                                                       | 1100                                                      | 27                                                                               | mg/kg           | ND               | U | 1.13  | 1  | ND               | U | 1.13  | 1  | ND                | U | 5.83  | 5  | ND               | U | 1.17  | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                                       | 29                                                                                       | 53                                                        | 29                                                                               | mg/kg           | 10.1             |   | 1.08  | 1  | 7.9              |   | 1.08  | 1  | 6.26              | J | 5.54  | 5  | 12.2             |   | 1.12  | 1  |
| Barium                    | 7440-39-3 | 200                                                                                     | 8200                                                                                     | 190000                                                    | 8200                                                                             | mg/kg           | 114              |   | 0.045 | 1  | 80.8             |   | 0.045 | 1  | 154               |   | 0.047 | 1  | 128              |   | 0.047 | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                                     | 320                                                                                      | 5600                                                      | 320                                                                              | mg/kg           | 0.427            | J | 0.077 | 1  | 1.6              |   | 0.077 | 1  | 2.06              |   | 0.079 | 1  | 0.78             |   | 0.08  | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                                     | 38                                                                                       | 1400                                                      | 38                                                                               | mg/kg           | 0.193            | J | 0.159 | 1  | ND               | U | 0.159 | 1  | 2.09              | J | 0.816 | 5  | ND               | U | 0.164 | 1  |
| Calcium                   | 7440-70-2 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 7050             |   | 6.95  | 1  | 37200            |   | 6.94  | 1  | 988               |   | 7.14  | 1  | 6090             |   | 7.2   | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 69.5             |   | 0.669 | 1  | 20.9             |   | 0.668 | 1  | 298               |   | 3.44  | 5  | 37               |   | 0.693 | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                                       | 140                                                                                      | 840                                                       | 140                                                                              | mg/kg           | 6.7              |   | 0.215 | 1  | 10.9             |   | 0.215 | 1  | 46.6              |   | 1.11  | 5  | 7.6              |   | 0.223 | 1  |
| Copper                    | 7440-50-8 | 100                                                                                     | 43000                                                                                    | 100000                                                    | 43000                                                                            | mg/kg           | 59.9             |   | 0.249 | 1  | 25.3             |   | 0.249 | 1  | 88.9              |   | 1.28  | 5  | 160              |   | 0.258 | 1  |
| Iron                      | 7439-89-6 | NS                                                                                      | NS                                                                                       | 190000                                                    | 190000                                                                           | mg/kg           | 31600            |   | 26.7  | 5  | 29300            |   | 5.33  | 1  | 69100             |   | 27.4  | 5  | 26700            |   | 5.53  | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                                     | 450                                                                                      | 1000                                                      | 450                                                                              | mg/kg           | 229              |   | 0.68  | 1  | 21.2             |   | 0.68  | 1  | 20.8              |   | 3.5   | 5  | 225              |   | 0.704 | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 4450             |   | 2.88  | 1  | 23700            |   | 2.88  | 1  | 2100              |   | 2.96  | 1  | 3450             |   | 2.98  | 1  |
| Manganese                 | 7439-96-5 | 30                                                                                      | 2000                                                                                     | 130000                                                    | 2000                                                                             | mg/kg           | 413              |   | 0.088 | 1  | 804              |   | 0.088 | 1  | 798               |   | 0.091 | 1  | 214              |   | 0.092 | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                                     | 10                                                                                       | 450                                                       | 10                                                                               | mg/kg           | 2.24             |   | 0.016 | 5  | 0.0447           | J | 0.003 | 1  | 0.0188            | J | 0.003 | 1  | 0.414            |   | 0.003 | 1  |
| Nickel                    | 7440-02-0 | 10                                                                                      | 650                                                                                      | 56000                                                     | 650                                                                              | mg/kg           | 63.1             |   | 0.215 | 1  | 17.7             |   | 0.215 | 1  | 132               |   | 1.11  | 5  | 26.1             |   | 0.223 | 1  |
| Potassium                 | 7440-09-7 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 1260             |   | 20.4  | 1  | 1200             |   | 20.4  | 1  | 1010              |   | 105   | 5  | 1550             |   | 21.1  | 1  |
| Selenium                  | 7782-49-2 | 5                                                                                       | 26                                                                                       | 14000                                                     | 26                                                                               | mg/kg           | ND               | U | 1.11  | 1  | 1.94             | J | 1.11  | 1  | ND                | U | 5.71  | 5  | ND               | U | 1.15  | 1  |
| Silver                    | 7440-22-4 | 10                                                                                      | 84                                                                                       | 14000                                                     | 84                                                                               | mg/kg           | ND               | U | 0.204 | 1  | ND               | U | 0.204 | 1  | ND                | U | 1.05  | 5  | ND               | U | 0.211 | 1  |
| Sodium                    | 7440-23-5 | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | mg/kg           | 122              |   | 42.3  | 1  | 70.7             | J | 42.2  | 1  | 147               |   | 43.5  | 1  | 83.3             | J | 43.8  | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                                     | 14                                                                                       | 200                                                       | 14                                                                               | mg/kg           | ND               | U | 1.64  | 1  | ND               | U | 1.64  | 1  | ND                | U | 8.45  | 5  | ND               | U | 1.7   | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                                      | 72000                                                                                    | 20000                                                     | 20000                                                                            | mg/kg           | 163              |   | 0.215 | 1  | 33.1             |   | 0.215 | 1  | 141               |   | 1.11  | 5  | 50.2             |   | 0.223 | 1  |
| Zinc                      | 7440-66-6 | 200                                                                                     | 12000                                                                                    | 190000                                                    | 12000                                                                            | mg/kg           | 234              |   | 0.748 | 1  | 72               |   | 0.747 | 1  | 66.4              |   | 3.85  | 5  | 109              |   | 0.775 | 1  |
| General Chemistry         |           |                                                                                         |                                                                                          |                                                           |                                                                                  |                 |                  |   |       |    |                  |   |       |    |                   |   |       |    |                  |   |       |    |
| Moisture, Percent         | MOIST     | NS                                                                                      | NS                                                                                       | NS                                                        | NS                                                                               | %               | 15.2             |   | 0.5   | 1  | 15.1             |   | 0.5   | 1  | 14.2              |   | 0.5   | 1  | 17.3             |   | 0.5   | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration Exceeds the PADEP Non-Residential Direct Contact Standard



Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                 | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44           |        |      |       | BH-10-45         |        |       |       | BH-10-46         |        |      |       | BH-10-55         |        |       |       | BH-10-56           |   |       |       |
|-----------------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|--------|------|-------|------------------|--------|-------|-------|------------------|--------|------|-------|------------------|--------|-------|-------|--------------------|---|-------|-------|
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 10-12' |        |      |       | BH-10-45-WC 5-8' |        |       |       | BH-10-46-WC 5-8' |        |      |       | BH-10-55-WC 5-8' |        |       |       | BH-10-56-WC 10-12' |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/12/2011          |        |      |       | 4/12/2011        |        |       |       | 4/12/2011        |        |      |       | 4/12/2011        |        |       |       | 4/12/2011          |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |        |      |       | Waste Soil       |        |       |       | Waste Soil       |        |      |       | Waste Soil       |        |       |       | Waste Soil         |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 10.0-12.0 ft bgs   |        |      |       | 5.0-8.0 ft bgs   |        |       |       | 5.0-8.0 ft bgs   |        |      |       | 5.0-8.0 ft bgs   |        |       |       | 10.0-12.0 ft bgs   |   |       |       |
| Unit                                          | Result     | Q                                                                              | RL                                                                              | DF                                                                                      | Result                                               | Q                                                                  | RL              | DF                 | Result | Q    | RL    | DF               | Result | Q     | RL    | DF               | Result | Q    | RL    | DF               | Result | Q     | RL    | DF                 |   |       |       |
| Volatile Organic Compounds                    |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |        |      |       |                  |        |       |       |                  |        |      |       |                  |        |       |       |                    |   |       |       |
| 1,1,1-Trichloroethane                         | 71-55-6    | 20                                                                             | 7.2                                                                             | 0.72                                                                                    | 10000.00                                             | 20                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,1,2,2-Tetrachloroethane                     | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 0.00093                                                                                 | 44                                                   | 0.03                                                               | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane         | 76-13-1    | 10000                                                                          | 10000                                                                           | 1000                                                                                    | 10000                                                | 10000                                                              | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| 1,1,2-Trichloroethane                         | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 0.015                                                                                   | 160                                                  | 0.5                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,1-Dichloroethane                            | 75-34-3    | 16                                                                             | 3.9                                                                             | 0.39                                                                                    | 1600                                                 | 16                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,1-Dichloroethene                            | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 0.019                                                                                   | 10000                                                | 0.7                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,2,4-Trichlorobenzene                        | 120-82-1   | 7                                                                              | 27                                                                              | 2.7                                                                                     | 10000                                                | 7                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,2-Dibromo-3-Chloropropane                   | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.00092                                                                                 | 0.43                                                 | 0.02                                                               | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| 1,2-Dibromoethane (Ethylene Dibromide)        | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 0.00012                                                                                 | 4.3                                                  | 0.005                                                              | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,2-Dichlorobenzene                           | 95-50-1    | 60                                                                             | 59                                                                              | 5.9                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,2-Dichloroethane                            | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 0.01                                                                                    | 98                                                   | 0.5                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,2-Dichloropropane                           | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 0.011                                                                                   | 260                                                  | 0.5                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,3-Dichlorobenzene                           | 541-73-1   | 60                                                                             | 61                                                                              | 6.1                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 1,4-Dichlorobenzene                           | 106-46-7   | 7.5                                                                            | 10                                                                              | 1                                                                                       | 230                                                  | 7.5                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| 2-Hexanone                                    | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 0.11                                                                                    | 460                                                  | 4.4                                                                | mg/kg           | ND                 | U      | 1.1  | 172.4 | ND               | U      | 0.23  | 61.23 | ND               | U      | 2    | 558.5 | ND               | U      | 0.33  | 66.54 | ND                 | U | 0.28  | 62.71 |
| Acetone                                       | 67-64-1    | 9200                                                                           | 1000                                                                            | 100                                                                                     | 10000                                                | 9200                                                               | mg/kg           | ND                 | U      | 2.5  | 172.4 | ND               | U      | 0.53  | 61.23 | ND               | U      | 4.7  | 558.5 | ND               | U      | 0.77  | 66.54 | ND                 | U | 0.65  | 62.71 |
| Benzene                                       | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 0.013                                                                                   | 330                                                  | 0.5                                                                | mg/kg           | 8.1                |        | 0.18 | 172.4 | 0.89             |        | 0.038 | 61.23 | 1.1              | J      | 0.34 | 558.5 | ND               | U      | 0.055 | 66.54 | 11                 |   | 0.046 | 62.71 |
| Bromodichloromethane                          | 75-27-4    | 8                                                                              | 2.7                                                                             | 0.27                                                                                    | 69                                                   | 8                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Bromoform                                     | 75-25-2    | 8                                                                              | 3.5                                                                             | 0.35                                                                                    | 2300                                                 | 8                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Bromomethane                                  | 74-83-9    | 1                                                                              | 0.54                                                                            | 0.054                                                                                   | 460                                                  | 1                                                                  | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| Carbon Disulfide                              | 75-15-0    | 620                                                                            | 530                                                                             | 53                                                                                      | 10000                                                | 620                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Carbon Tetrachloride                          | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 0.026                                                                                   | 170                                                  | 0.5                                                                | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Chlorobenzene                                 | 108-90-7   | 10                                                                             | 6.1                                                                             | 0.61                                                                                    | 4600                                                 | 10                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Chloroethane                                  | 75-00-3    | 90                                                                             | 19                                                                              | 1.9                                                                                     | 10000                                                | 90                                                                 | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| Chloroform                                    | 67-66-3    | 8                                                                              | 2                                                                               | 0.2                                                                                     | 110                                                  | 8                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Chloromethane                                 | 74-87-3    | 3                                                                              | 0.38                                                                            | 0.038                                                                                   | 1400                                                 | 3                                                                  | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| Cis-1,2-Dichloroethylene                      | 156-59-2   | 7                                                                              | 1.6                                                                             | 0.16                                                                                    | 10000                                                | 7                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Cis-1,3-Dichloropropene                       | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Cyclohexane                                   | 110-82-7   | 5300                                                                           | 6900                                                                            | 690                                                                                     | 10000                                                | 5300                                                               | mg/kg           | 13                 |        | 0.36 | 172.4 | 2.1              |        | 0.076 | 61.23 | 0.77             | J      | 0.68 | 558.5 | 0.21             | J      | 0.11  | 66.54 | 0.59               |   | 0.093 | 62.71 |
| Dibromochloromethane                          | 124-48-1   | 8                                                                              | 2.5                                                                             | 0.25                                                                                    | 95                                                   | 8                                                                  | mg/kg           | ND                 | U      | 0.36 | 172.4 | ND               | U      | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | ND               | U      | 0.11  | 66.54 | ND                 | U | 0.093 | 62.71 |
| Dichlorodifluoromethane                       | 75-71-8    | 100                                                                            | 100                                                                             | 10                                                                                      | 10000                                                | 100                                                                | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | ND                 | U | 0.19  | 62.71 |
| Dimethyl Benzene/ Xylenes, Total              | 1330-20-7  | 1000                                                                           | 990                                                                             | 99                                                                                      | 9100                                                 | 1000                                                               | mg/kg           | 460                |        | 3.6  | 1724  | 11               |        | 0.076 | 61.23 | 7.3              |        | 0.68 | 558.5 | 2.7              |        | 0.11  | 66.54 | 13                 |   | 0.093 | 62.71 |
| Ethylbenzene                                  | 100-41-4   | 70                                                                             | 46                                                                              | 4.6                                                                                     | 10000                                                | 70                                                                 | mg/kg           | 76                 |        | 0.36 | 172.4 | 5.9              |        | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | 0.39             | J      | 0.11  | 66.54 | 2.5                |   | 0.093 | 62.71 |
| Isopropylbenzene (Cumene)                     | 98-82-8    | 350                                                                            | 2500                                                                            | 250                                                                                     | 10000                                                | 350                                                                | mg/kg           | 20                 |        | 0.36 | 172.4 | 3.9              |        | 0.076 | 61.23 | ND               | U      | 0.68 | 558.5 | 0.53             | J      | 0.11  | 66.54 | 1.2                |   | 0.093 | 62.71 |
| Methyl Acetate                                | 79-20-9    | 10000                                                                          | 1900                                                                            | 190                                                                                     | 10000                                                | 10000                                                              | mg/kg           | ND                 | U      | 0.71 | 172.4 | 0.26             | J      | 0.15  | 61.23 | 6.6              |        | 1.4  | 558.5 | ND               | U      | 0.22  | 66.54 | 0.67               |   | 0.19  | 62.71 |
| Methyl Ethyl Ketone (2-Butanone)              | 78-93-3    | 400                                                                            | 76                                                                              | 7.6                                                                                     | 10000                                                | 400                                                                | mg/kg           | ND                 | U      | 1.4  | 172.4 | ND               | U      | 0.31  | 61.23 | ND               | U      | 2.7  | 558.5 | ND               | U      | 0.44  | 66.54 | ND                 | U | 0.37  | 62.71 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 108-10-1   | 820                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 820                                                                | mg/kg           | ND                 | U      | 1.1  | 172.4 | ND               | U      | 0.23  | 61.23 | ND               | U      | 2    | 558.5 | ND               | U      | 0.33  | 66.54 | ND                 | U | 0.28  | 62.71 |
| Methylcyclohexane                             | 108-87-2   | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 63                 |        | 0.36 | 172.4 | 12               |        | 0.076 | 61.23 | 1.6              | J      | 0.68 | 558.5 | 2.3              |        | 0.11  | 66.54 | 1.5                |   | 0.093 | 62.71 |
| Methylene Chloride                            | 75-09-2    | 0.5                                                                            | 0.076                                                                           | 0.0076                                                                                  | 5400                                                 | 0.5                                                                | mg/kg           | ND                 | U      | 0.71 | 172.4 | ND               | U      | 0.15  | 61.23 | ND               | U      | 1.4  | 558.5 | ND               | U      | 0.22  | 6     |                    |   |       |       |

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44           |   |     |    |        | BH-10-45         |     |    |        | BH-10-46         |    |    |        | BH-10-55         |      |    |        | BH-10-56           |     |    |  |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-----|----|--------|------------------|-----|----|--------|------------------|----|----|--------|------------------|------|----|--------|--------------------|-----|----|--|
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 10-12' |   |     |    |        | BH-10-45-WC 5-8' |     |    |        | BH-10-46-WC 5-8' |    |    |        | BH-10-55-WC 5-8' |      |    |        | BH-10-56-WC 10-12' |     |    |  |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/12/2011          |   |     |    |        | 4/12/2011        |     |    |        | 4/12/2011        |    |    |        | 4/12/2011        |      |    |        | 4/12/2011          |     |    |  |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |   |     |    |        | Waste Soil       |     |    |        | Waste Soil       |    |    |        | Waste Soil       |      |    |        | Waste Soil         |     |    |  |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 10.0-12.0 ft bgs   |   |     |    |        | 5.0-8.0 ft bgs   |     |    |        | 5.0-8.0 ft bgs   |    |    |        | 5.0-8.0 ft bgs   |      |    |        | 10.0-12.0 ft bgs   |     |    |  |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL  | DF | Result | Q                | RL  | DF | Result | Q                | RL | DF | Result | Q                | RL   | DF | Result | Q                  | RL  | DF |  |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |     |    |        |                  |     |    |        |                  |    |    |        |                  |      |    |        |                    |     |    |  |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 610                                                                                     | 190000                                               | 1000                                                               | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2.9                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 0.1                                                                                     | 190000                                               | 2                                                                  | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 0.23                                                                                    | 190000                                               | 20                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 20 | 10 | ND     | U                | 2.7  | 1  | ND     | U                  | 12  | 5  |  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 0.02                                                                                    | 190000                                               | 0.84                                                               | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 0.3                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 1800                                                                                    | 190000                                               | 1800                                                               | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 0.44                                                                                    | 10000                                                | 4                                                                  | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 160                                                                                     | 190000                                               | 160                                                                | mg/kg           | 1500               |   | 2.1 | 50 | 110    |                  | 2.1 | 5  | 39     |                  | 2  | 10 | 18     |                  | 0.27 | 1  | 15     |                    | 1.2 | 5  |  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 8.5                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 0.55                                                                                    | 190000                                               | 31                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 1.7                                                                                     | 190000                                               | 82                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 3.2                                                                                     | 190000                                               | 3.2                                                                | mg/kg           | ND                 | U | 12  | 10 | ND     | U                | 6.2 | 5  | ND     | U                | 6  | 10 | ND     | U                | 0.82 | 1  | ND     | U                  | 3.7 | 5  |  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 0.048                                                                                   | 190000                                               | 3.1                                                                | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 0.075                                                                                   | 190000                                               | 1                                                                  | mg/kg           | ND                 | U | 21  | 10 | ND     | U                | 10  | 5  | ND     | U                | 10 | 10 | ND     | U                | 1.4  | 1  | ND     | U                  | 6.1 | 5  |  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 11                                                                                      | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 0.16                                                                                    | 190000                                               | 1.3                                                                | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 1.2                                                                                     | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 0.19                                                                                    | 190000                                               | 13                                                                 | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 0.41                                                                                    | 190000                                               | 6                                                                  | mg/kg           | ND                 | U | 21  | 10 | ND     | U                | 10  | 5  | ND     | U                | 10 | 10 | ND     | U                | 1.4  | 1  | ND     | U                  | 6.1 | 5  |  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 470                                                                                     | 190000                                               | 470                                                                | mg/kg           | 66                 |   | 4.1 | 10 | 5.7    | J                | 2.1 | 5  | ND     | U                | 2  | 10 | 1.6    |                  | 0.27 | 1  | 2.2    | J                  | 1.2 | 5  |  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 690                                                                                     | 190000                                               | 690                                                                | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 54                                                                                      | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 35                                                                                      | 190000                                               | 35                                                                 | mg/kg           | 32                 |   | 4.1 | 10 | 2.5    | J                | 2.1 | 5  | ND     | U                | 2  | 10 | 0.45   | J                | 0.27 | 1  | 1.5    | J                  | 1.2 | 5  |  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 0.013                                                                                   | 190000                                               | 0.3                                                                | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 8.4                | J | 4.1 | 10 | 3.4    | J                | 2.1 | 5  | ND     | U                | 2  | 10 | 0.34   | J                | 0.27 | 1  | 3.3    | J                  | 1.2 | 5  |  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 4.6                                                                                     | 190000                                               | 4.6                                                                | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | 7.3    | J                | 2  | 10 | ND     | U                | 0.27 | 1  | 3.1    | J                  | 1.2 | 5  |  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 17                                                                                      | 190000                                               | 17                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | 2.4    | J                | 2  | 10 | ND     | U                | 0.27 | 1  | 2.6    | J                  | 1.2 | 5  |  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 18                                                                                      | 190000                                               | 18                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | 3.3    | J                  | 1.2 | 5  |  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 61                                                                                      | 190000                                               | 61                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 220                                                                                     | 190000                                               | 510                                                                | mg/kg           | 98                 |   | 4.1 | 10 | 6.4    | J                | 2.1 | 5  | ND     | U                | 2  | 10 | 1.6    |                  | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 0.82                                                                                    | 10000                                                | 31                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 0.0023                                                                                  | 7.7                                                  | 0.076                                                              | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 0.8                                                                                     | 250                                                  | 30                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Bis(2-Ethylhexyl) Phthalate                    | 117-81-7  | 0.6                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 13                                                                 | mg/kg           | ND                 | U | 8.3 | 10 | ND     | U                | 4.1 | 5  | ND     | U                | 4  | 10 | ND     | U                | 0.54 | 1  | ND     | U                  | 2.4 | 5  |  |
| Caprolactam                                    | 105-60-2  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Carbazole                                      | 86-74-8   | 13                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 13                                                                 | mg/kg           | ND                 | U | 4.1 | 10 | ND     | U                | 2.1 | 5  | ND     | U                | 2  | 10 | ND     | U                | 0.27 | 1  | ND     | U                  | 1.2 | 5  |  |
| Chrysene                                       | 218-01-9  | 0.19                                                                           | 230                                                                             | 23                                                                                      | 190000                                               | 23                                                                 | mg/kg           | 16                 | J | 4.1 | 10 | 15     |                  | 2.1 | 5  | 14     |                  | 2  | 10 | 0.67   | J                | 0.27 | 1  | 5.7    | J                  | 1.2 | 5  |  |
| Dibenz(A,H)Anthracene                          |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |     |    |        |                  |     |    |        |                  |    |    |        |                  |      |    |        |                    |     |    |  |

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44           |   |       |    | BH-10-45         |   |       |    | BH-10-46         |   |       |    | BH-10-55         |   |       |    | BH-10-56           |   |       |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------|----|------------------|---|-------|----|------------------|---|-------|----|------------------|---|-------|----|--------------------|---|-------|----|
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 10-12' |   |       |    | BH-10-45-WC 5-8' |   |       |    | BH-10-46-WC 5-8' |   |       |    | BH-10-55-WC 5-8' |   |       |    | BH-10-56-WC 10-12' |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/12/2011          |   |       |    | 4/12/2011        |   |       |    | 4/12/2011        |   |       |    | 4/12/2011        |   |       |    | 4/12/2011          |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |   |       |    | Waste Soil       |   |       |    | Waste Soil       |   |       |    | Waste Soil       |   |       |    | Waste Soil         |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 10.0-12.0 ft bgs   |   |       |    | 5.0-8.0 ft bgs   |   |       |    | 5.0-8.0 ft bgs   |   |       |    | 5.0-8.0 ft bgs   |   |       |    | 10.0-12.0 ft bgs   |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL    | DF | Result           | Q | RL    | DF | Result           | Q | RL    | DF | Result           | Q | RL    | DF | Result             | Q | RL    | DF |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 380                                                                                     | 190000                                               | 380                                                                | mg/kg           | 96                 |   | 4.1   | 10 | 8.6              | J | 2.1   | 5  | ND               | U | 2     | 10 | 1.5              |   | 0.27  | 1  | 2.7                | J | 1.2   | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 0.096                                                                                   | 190000                                               | 0.1                                                                | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 3.9                                                                                     | 10000                                                | 3.9                                                                | mg/kg           | ND                 | U | 8.3   | 10 | ND               | U | 4.1   | 5  | ND               | U | 4     | 10 | ND               | U | 0.54  | 1  | ND                 | U | 2.4   | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 9.1                                                                                     | 10000                                                | 9.1                                                                | mg/kg           | ND                 | U | 21    | 10 | ND               | U | 10    | 5  | ND               | U | 10    | 10 | ND               | U | 1.4   | 1  | ND                 | U | 6.1   | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 0.056                                                                                   | 640                                                  | 0.1                                                                | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 2800                                                                                    | 190000                                               | 2800                                                               | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | 1.4                | J | 1.2   | 5  |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 0.19                                                                                    | 10000                                                | 10                                                                 | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 2.5                                                                                     | 190000                                               | 10                                                                 | mg/kg           | 410                |   | 4.1   | 10 | 27               |   | 2.1   | 5  | 16               |   | 2     | 10 | 2.5              |   | 0.27  | 1  | 7.1                |   | 1.2   | 5  |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 0.87                                                                                    | 10000                                                | 20                                                                 | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 0.00051                                                                                 | 10000                                                | 0.037                                                              | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 53                                                                 | mg/kg           | ND                 | U | 4.1   | 10 | 15               |   | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 0.5                                                                                     | 190000                                               | 0.5                                                                | mg/kg           | ND                 | U | 21    | 10 | ND               | U | 10    | 5  | ND               | U | 10    | 10 | ND               | U | 1.4   | 1  | ND                 | U | 6.1   | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 1000                                                                                    | 190000                                               | 1000                                                               | mg/kg           | 200                |   | 4.1   | 10 | 23               |   | 2.1   | 5  | 9.4              | J | 2     | 10 | 5.6              |   | 0.27  | 1  | 12                 |   | 1.2   | 5  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 3.3                                                                                     | 190000                                               | 200                                                                | mg/kg           | ND                 | U | 4.1   | 10 | ND               | U | 2.1   | 5  | ND               | U | 2     | 10 | ND               | U | 0.27  | 1  | ND                 | U | 1.2   | 5  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 220                                                                                     | 190000                                               | 220                                                                | mg/kg           | 21                 | J | 4.1   | 10 | 4.7              | J | 2.1   | 5  | 6.1              | J | 2     | 10 | 0.72             | J | 0.27  | 1  | 4.7                | J | 1.2   | 5  |
| Metals                    |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                  |   |       |    |                  |   |       |    |                  |   |       |    |                    |   |       |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 20400              |   | 10.3  | 1  | 12000            |   | 6.09  | 1  | 7050             |   | 5.98  | 1  | 14000            |   | 8.22  | 1  | 15500              |   | 7.45  | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 2.7                                                                                     | 190000                                               | 2.7                                                                | mg/kg           | 4.02               | J | 2.05  | 1  | ND               | U | 1.21  | 1  | ND               | U | 1.19  | 1  | ND               | U | 8.17  | 5  | ND                 | U | 1.48  | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 2.9                                                                                     | 190000                                               | 2.9                                                                | mg/kg           | 21.9               |   | 1.95  | 1  | 10.7             |   | 1.15  | 1  | 6.14             |   | 1.13  | 1  | 12.7             |   | 1.55  | 1  | 13.5               |   | 1.41  | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 820                                                                                     | 190000                                               | 820                                                                | mg/kg           | 349                |   | 0.082 | 1  | 122              |   | 0.048 | 1  | 116              |   | 0.048 | 1  | 88.8             |   | 0.065 | 1  | 178                |   | 0.059 | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 0.664              | J | 0.139 | 1  | 0.551            | J | 0.082 | 1  | 0.103            | J | 0.081 | 1  | 0.425            | J | 0.111 | 1  | 0.64               | J | 0.101 | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 3.8                                                                                     | 190000                                               | 3.8                                                                | mg/kg           | 0.744              | J | 0.287 | 1  | ND               | U | 0.169 | 1  | ND               | U | 0.166 | 1  | 0.422            | J | 0.229 | 1  | ND                 | U | 0.207 | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 140000             |   | 62.8  | 5  | 20900            |   | 7.42  | 1  | 9240             |   | 7.28  | 1  | 152000           |   | 50.1  | 5  | 53700              |   | 9.08  | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 908                |   | 1.21  | 1  | 160              |   | 0.714 | 1  | 20.1             |   | 0.701 | 1  | 475              |   | 0.964 | 1  | 282                |   | 0.874 | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 14                                                                                      | 190000                                               | 14                                                                 | mg/kg           | 10.2               |   | 0.389 | 1  | 10               |   | 0.23  | 1  | 1.01             |   | 0.226 | 1  | 6.24             |   | 0.31  | 1  | 9.6                |   | 0.281 | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 4300                                                                                    | 190000                                               | 4300                                                               | mg/kg           | 191                |   | 0.451 | 1  | 80.3             |   | 0.266 | 1  | 165              |   | 0.261 | 1  | 120              |   | 0.359 | 1  | 163                |   | 0.326 | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 16200              |   | 9.66  | 1  | 26600            |   | 5.7   | 1  | 4770             |   | 5.6   | 1  | 11300            |   | 7.7   | 1  | 28100              |   | 6.98  | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 45                                                                                      | 190000                                               | 45                                                                 | mg/kg           | 640                |   | 1.23  | 1  | 307              |   | 0.726 | 1  | 79.6             |   | 0.713 | 1  | 316              |   | 0.98  | 1  | 676                |   | 0.889 | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 47000              |   | 5.21  | 1  | 8680             |   | 3.07  | 1  | 2330             |   | 3.02  | 1  | 116000           |   | 20.7  | 5  | 24900              |   | 3.76  | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 200                                                                                     | 190000                                               | 200                                                                | mg/kg           | 937                |   | 0.16  | 1  | 434              |   | 0.094 | 1  | 110              |   | 0.093 | 1  | 617              |   | 0.127 | 1  | 675                |   | 0.116 | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 1                                                                                       | 190000                                               | 1                                                                  | mg/kg           | 1.07               |   | 0.006 | 1  | 0.667            |   | 0.003 | 1  | 0.0629           | J | 0.003 | 1  | 0.116            | J | 0.005 | 1  | 1.88               |   | 0.021 | 5  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 65                                                                                      | 190000                                               | 65                                                                 | mg/kg           | 53.4               |   | 0.389 | 1  | 34.1             |   | 0.23  | 1  | 9.31             |   | 0.226 | 1  | 38.4             |   | 0.31  | 1  | 67.7               |   | 0.281 | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 990                |   | 36.9  | 1  | 1490             |   | 21.8  | 1  | 397              |   | 21.4  | 1  | 496              |   | 29.4  | 1  | 2010               |   | 26.7  | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 2.6                                                                                     | 190000                                               | 5                                                                  | mg/kg           | ND                 | U | 2.01  | 1  | ND               | U | 1.19  | 1  | ND               | U | 1.16  | 1  | 1.68             | J | 1.6   | 1  | ND                 | U | 1.45  | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 8.4                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 0.369 | 1  | ND               | U | 0.218 | 1  | ND               | U | 0.214 | 1  | ND               | U | 0.294 | 1  | 0.29               | J | 0.267 | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 269                |   | 76.5  | 1  | 114              | J | 45.2  | 1  | 114              | J | 44.3  | 1  | 85.4             | J | 60.9  | 1  | 402                |   | 55.3  | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 1.4                                                                                     | 190000                                               | 1.4                                                                | mg/kg           | ND                 | U | 2.97  | 1  | 4.31             |   | 1.76  | 1  | ND               | U | 1.72  | 1  | 3.3              | J | 2.37  | 1  | 6.02               |   | 2.15  | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 7200                                                                                    | 190000                                               | 7200                                                               | mg/kg           | 100                |   | 0.389 | 1  | 76.5             |   | 0.23  | 1  | 19.8             |   | 0.226 | 1  | 71.7             |   | 0.31  | 1  | 120                |   | 0.281 | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 1200                                                                                    | 190000                                               | 1200                                                               | mg/kg           | 870                |   | 1.35  | 1  | 229              |   | 0.799 | 1  | 21.3             |   | 0.784 | 1  | 641              |   | 1.08  | 1  | 513                |   | 0.978 | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                  |   |       |    |                  |   |       |    |                  |   |       |    |                    |   |       |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | %               | 51.7               |   | 0.5   | 1  | 19.8             |   | 0.5   | 1  | 17.5             |   | 0.5   | 1  | 39.4             |   | 0.5   | 1  | 32.5               |   | 0.5   | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  
**10** - RL exceeds the PADEP Non-Residential Soil MSC  
**10** - Concentration exceeds the PADEP Non-Residential Soil MSC  
**10** - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                 | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |       |       | BH-10-64           |   |       |       | BH-10-65       |   |       |       | BH-10-69         |   |      |     |
|-----------------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------|-------|--------------------|---|-------|-------|----------------|---|-------|-------|------------------|---|------|-----|
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC 12-14' |   |       |       | BH-10-64-WC 11-13' |   |       |       | BH-10-65 6-8'  |   |       |       | BH-10-69-WC 5-8' |   |      |     |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |       |       | 4/13/2011          |   |       |       | 4/14/2011      |   |       |       | 4/12/2011        |   |      |     |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |   |       |       | Waste Soil         |   |       |       | Waste Soil     |   |       |       | Waste Soil       |   |      |     |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 12.0-14.0 ft bgs   |   |       |       | 11.0-13.0 ft bgs   |   |       |       | 6.0-8.0 ft bgs |   |       |       | 5.0-8.0 ft bgs   |   |      |     |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL    | DF    | Result             | Q | RL    | DF    | Result         | Q | RL    | DF    | Result           | Q | RL   | DF  |
| Volatile Organic Compounds                    |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |       |                    |   |       |       |                |   |       |       |                  |   |      |     |
| 1,1,1-Trichloroethane                         | 71-55-6    | 20                                                                             | 7.2                                                                             | 0.72                                                                                    | 10000.00                                             | 20                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,1,2,2-Tetrachloroethane                     | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 0.00093                                                                                 | 44                                                   | 0.03                                                               | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane         | 76-13-1    | 10000                                                                          | 10000                                                                           | 1000                                                                                    | 10000                                                | 10000                                                              | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| 1,1,2-Trichloroethane                         | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 0.015                                                                                   | 160                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,1-Dichloroethane                            | 75-34-3    | 16                                                                             | 3.9                                                                             | 0.39                                                                                    | 1600                                                 | 16                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,1-Dichloroethene                            | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 0.019                                                                                   | 10000                                                | 0.7                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,2,4-Trichlorobenzene                        | 120-82-1   | 7                                                                              | 27                                                                              | 2.7                                                                                     | 10000                                                | 7                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,2-Dibromo-3-Chloropropane                   | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.00092                                                                                 | 0.43                                                 | 0.02                                                               | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| 1,2-Dibromoethane (Ethylene Dibromide)        | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 0.00012                                                                                 | 4.3                                                  | 0.005                                                              | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,2-Dichlorobenzene                           | 95-50-1    | 60                                                                             | 59                                                                              | 5.9                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,2-Dichloroethane                            | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 0.01                                                                                    | 98                                                   | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | 9.3                |   | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,2-Dichloropropane                           | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 0.011                                                                                   | 260                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,3-Dichlorobenzene                           | 541-73-1   | 60                                                                             | 61                                                                              | 6.1                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 1,4-Dichlorobenzene                           | 106-46-7   | 7.5                                                                            | 10                                                                              | 1                                                                                       | 230                                                  | 7.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| 2-Hexanone                                    | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 0.11                                                                                    | 460                                                  | 4.4                                                                | mg/kg           | ND                 | U | 0.19  | 50.69 | ND                 | U | 0.39  | 104.6 | ND             | U | 0.55  | 126.7 | ND               | U | 2    | 547 |
| Acetone                                       | 67-64-1    | 9200                                                                           | 1000                                                                            | 100                                                                                     | 10000                                                | 9200                                                               | mg/kg           | 0.47               | J | 0.45  | 50.69 | ND                 | U | 0.9   | 104.6 | ND             | U | 1.3   | 126.7 | ND               | U | 4.7  | 547 |
| Benzene                                       | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 0.013                                                                                   | 330                                                  | 0.5                                                                | mg/kg           | 1.9                |   | 0.032 | 50.69 | 19                 |   | 0.065 | 104.6 | 35             |   | 0.092 | 126.7 | 0.9              | J | 0.34 | 547 |
| Bromodichloromethane                          | 75-27-4    | 8                                                                              | 2.7                                                                             | 0.27                                                                                    | 69                                                   | 8                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Bromoform                                     | 75-25-2    | 8                                                                              | 3.5                                                                             | 0.35                                                                                    | 2300                                                 | 8                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Bromomethane                                  | 74-83-9    | 1                                                                              | 0.54                                                                            | 0.054                                                                                   | 460                                                  | 1                                                                  | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Carbon Disulfide                              | 75-15-0    | 620                                                                            | 530                                                                             | 53                                                                                      | 10000                                                | 620                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Carbon Tetrachloride                          | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 0.026                                                                                   | 170                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Chlorobenzene                                 | 108-90-7   | 10                                                                             | 6.1                                                                             | 0.61                                                                                    | 4600                                                 | 10                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Chloroethane                                  | 75-00-3    | 90                                                                             | 19                                                                              | 1.9                                                                                     | 10000                                                | 90                                                                 | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Chloroform                                    | 67-66-3    | 8                                                                              | 2                                                                               | 0.2                                                                                     | 110                                                  | 8                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Chloromethane                                 | 74-87-3    | 3                                                                              | 0.38                                                                            | 0.038                                                                                   | 1400                                                 | 3                                                                  | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Cis-1,2-Dichloroethylene                      | 156-59-2   | 7                                                                              | 1.6                                                                             | 0.16                                                                                    | 10000                                                | 7                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Cis-1,3-Dichloropropene                       | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Cyclohexane                                   | 110-82-7   | 5300                                                                           | 6900                                                                            | 690                                                                                     | 10000                                                | 5300                                                               | mg/kg           | 1.9                |   | 0.064 | 50.69 | 2.8                |   | 0.13  | 104.6 | 6.7            |   | 0.18  | 126.7 | 1.7              | J | 0.68 | 547 |
| Dibromochloromethane                          | 124-48-1   | 8                                                                              | 2.5                                                                             | 0.25                                                                                    | 95                                                   | 8                                                                  | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Dichlorodifluoromethane                       | 75-71-8    | 100                                                                            | 100                                                                             | 10                                                                                      | 10000                                                | 100                                                                | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Dimethyl Benzene/ Xylenes, Total              | 1330-20-7  | 1000                                                                           | 990                                                                             | 99                                                                                      | 9100                                                 | 1000                                                               | mg/kg           | 0.092              | J | 0.064 | 50.69 | 5.7                |   | 0.13  | 104.6 | 57             |   | 0.18  | 126.7 | 4.9              |   | 0.68 | 547 |
| Ethylbenzene                                  | 100-41-4   | 70                                                                             | 46                                                                              | 4.6                                                                                     | 10000                                                | 70                                                                 | mg/kg           | 0.08               | J | 0.064 | 50.69 | 2.4                |   | 0.13  | 104.6 | 7.5            |   | 0.18  | 126.7 | 1.3              | J | 0.68 | 547 |
| Isopropylbenzene (Cumene)                     | 98-82-8    | 350                                                                            | 2500                                                                            | 250                                                                                     | 10000                                                | 350                                                                | mg/kg           | 1.4                |   | 0.064 | 50.69 | 4.5                |   | 0.13  | 104.6 | 5.1            |   | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Methyl Acetate                                | 79-20-9    | 10000                                                                          | 1900                                                                            | 190                                                                                     | 10000                                                | 10000                                                              | mg/kg           | 0.33               |   | 0.13  | 50.69 | 0.33               | J | 0.26  | 104.6 | 0.91           | J | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Methyl Ethyl Ketone (2-Butanone)              | 78-93-3    | 400                                                                            | 76                                                                              | 7.6                                                                                     | 10000                                                | 400                                                                | mg/kg           | ND                 | U | 0.26  | 50.69 | ND                 | U | 0.52  | 104.6 | ND             | U | 0.73  | 126.7 | ND               | U | 2.7  | 547 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 108-10-1   | 820                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 820                                                                | mg/kg           | ND                 | U | 0.19  | 50.69 | ND                 | U | 0.39  | 104.6 | ND             | U | 0.55  | 126.7 | ND               | U | 2    | 547 |
| Methylcyclohexane                             | 108-87-2   | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 11                 |   | 0.064 | 50.69 | 16                 |   | 0.13  | 104.6 | 26             |   | 0.18  | 126.7 | 3.1              | J | 0.68 | 547 |
| Methylene Chloride                            | 75-09-2    | 0.5                                                                            | 0.076                                                                           | 0.0076                                                                                  | 5400                                                 | 0.5                                                                | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Styrene                                       | 100-42-5   | 10                                                                             | 24                                                                              | 2.4                                                                                     | 10000                                                | 10                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Tert-Butyl Methyl Ether                       | 1634-04-4  | 2                                                                              | 0.28                                                                            | 0.028                                                                                   | 3700                                                 | 2                                                                  | mg/kg           | ND                 | U | 0.032 | 50.69 | ND                 | U | 0.065 | 104.6 | ND             | U | 0.092 | 126.7 | ND               | U | 0.34 | 547 |
| Tetrachloroethylene(PCE)                      | 127-18-4   | 0.5                                                                            | 0.43                                                                            | 0.043                                                                                   | 4400                                                 | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Toluene                                       | 108-88-3   | 100                                                                            | 44                                                                              | 4.4                                                                                     | 10000                                                | 100                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | 0.64               | J | 0.13  | 104.6 | 5.8            |   | 0.18  | 126.7 | 1.1              | J | 0.68 | 547 |
| Trans-1,2-Dichloroethene                      | 156-60-5   | 10                                                                             | 2.3                                                                             | 0.23                                                                                    | 5500                                                 | 10                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Trans-1,3-Dichloropropene                     | 10061-02-6 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Trichloroethylene (TCE)                       | 79-01-6    | 0.5                                                                            | 0.17                                                                            | 0.017                                                                                   | 1500                                                 | 0.5                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |
| Trichlorofluoromethane                        | 75-69-4    | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                 | U | 0.13  | 50.69 | ND                 | U | 0.26  | 104.6 | ND             | U | 0.37  | 126.7 | ND               | U | 1.4  | 547 |
| Vinyl Chloride                                | 75-01-4    | 0.2                                                                            | 0.027                                                                           | 0.0027                                                                                  | 580                                                  | 0.2                                                                | mg/kg           | ND                 | U | 0.064 | 50.69 | ND                 | U | 0.13  | 104.6 | ND             | U | 0.18  | 126.7 | ND               | U | 0.68 | 547 |

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |     |    | BH-10-64           |   |      |    | BH-10-65       |   |     |    | BH-10-69         |   |     |    |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-----|----|--------------------|---|------|----|----------------|---|-----|----|------------------|---|-----|----|
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC 12-14' |   |     |    | BH-10-64-WC 11-13' |   |      |    | BH-10-65 6-8'  |   |     |    | BH-10-69-WC 5-8' |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |     |    | 4/13/2011          |   |      |    | 4/14/2011      |   |     |    | 4/12/2011        |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |   |     |    | Waste Soil         |   |      |    | Waste Soil     |   |     |    | Waste Soil       |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 12.0-14.0 ft bgs   |   |     |    | 11.0-13.0 ft bgs   |   |      |    | 6.0-8.0 ft bgs |   |     |    | 5.0-8.0 ft bgs   |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL  | DF | Result             | Q | RL   | DF | Result         | Q | RL  | DF | Result           | Q | RL  | DF |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |     |    |                    |   |      |    |                |   |     |    |                  |   |     |    |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 610                                                                                     | 190000                                               | 1000                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2.9                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 0.1                                                                                     | 190000                                               | 2                                                                  | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                 | U | 2.1 | 5  | 2.2                |   | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 0.23                                                                                    | 190000                                               | 20                                                                 | mg/kg           | ND                 | U | 10  | 5  | ND                 | U | 2    | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 0.02                                                                                    | 190000                                               | 0.84                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 0.3                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 1800                                                                                    | 190000                                               | 1800                                                               | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 0.44                                                                                    | 10000                                                | 4                                                                  | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 160                                                                                     | 190000                                               | 160                                                                | mg/kg           | 57                 |   | 1   | 5  | 38                 |   | 2    | 50 | 280            |   | 2.4 | 50 | 21               |   | 2   | 10 |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 8.5                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 0.55                                                                                    | 190000                                               | 31                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 1.7                                                                                     | 190000                                               | 82                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 3.2                                                                                     | 190000                                               | 3.2                                                                | mg/kg           | ND                 | U | 3.1 | 5  | ND                 | U | 0.61 | 5  | ND             | U | 7.2 | 5  | ND               | U | 6.1 | 10 |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 0.048                                                                                   | 190000                                               | 3.1                                                                | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 0.075                                                                                   | 190000                                               | 1                                                                  | mg/kg           | ND                 | U | 5.2 | 5  | ND                 | U | 1    | 5  | ND             | U | 12  | 5  | ND               | U | 10  | 10 |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 11                                                                                      | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 0.16                                                                                    | 190000                                               | 1.3                                                                | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 1.2                                                                                     | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 0.19                                                                                    | 190000                                               | 13                                                                 | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 0.41                                                                                    | 190000                                               | 6                                                                  | mg/kg           | ND                 | U | 5.2 | 5  | ND                 | U | 1    | 5  | ND             | U | 12  | 5  | ND               | U | 10  | 10 |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 470                                                                                     | 190000                                               | 470                                                                | mg/kg           | 2                  | J | 1   | 5  | 3.4                |   | 0.2  | 5  | 15             |   | 2.4 | 5  | ND               | U | 2   | 10 |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 690                                                                                     | 190000                                               | 690                                                                | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 54                                                                                      | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 35                                                                                      | 190000                                               | 35                                                                 | mg/kg           | 1.7                | J | 1   | 5  | 2.9                |   | 0.2  | 5  | 7.8            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 0.013                                                                                   | 190000                                               | 0.3                                                                | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 3.1                | J | 1   | 5  | 3.4                |   | 0.2  | 5  | 7.2            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 4.6                                                                                     | 190000                                               | 4.6                                                                | mg/kg           | 3.5                | J | 1   | 5  | 2.8                |   | 0.2  | 5  | 5.7            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 17                                                                                      | 190000                                               | 17                                                                 | mg/kg           | 3                  | J | 1   | 5  | 3.3                |   | 0.2  | 5  | 6.1            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 18                                                                                      | 190000                                               | 18                                                                 | mg/kg           | 3.7                | J | 1   | 5  | 1.8                |   | 0.2  | 5  | 5.2            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 61                                                                                      | 190000                                               | 61                                                                 | mg/kg           | ND                 | U | 1   | 5  | 1.1                |   | 0.2  | 5  | 2.6            | J | 2.4 | 5  | ND               | U | 2   | 10 |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 220                                                                                     | 190000                                               | 510                                                                | mg/kg           | 1.9                | J | 1   | 5  | 2.1                |   | 0.2  | 5  | 26             |   | 2.4 | 5  | ND               | U | 2   | 10 |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 0.82                                                                                    | 10000                                                | 31                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 0.0023                                                                                  | 7.7                                                  | 0.076                                                              | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 0.8                                                                                     | 250                                                  | 30                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Bis(2-Ethylhexyl) Phthalate                    | 117-81-7  | 0.6                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 13                                                                 | mg/kg           | 4.4                | J | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Caprolactam                                    | 105-60-2  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 1   | 5  | ND                 | U | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Carbazole                                      | 86-74-8   | 13                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 13                                                                 | mg/kg           | ND                 | U | 1   | 5  | 0.48               | J | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Chrysene                                       | 218-01-9  | 0.19                                                                           | 230                                                                             | 23                                                                                      | 190000                                               | 23                                                                 | mg/kg           | 9                  |   | 1   | 5  | 4                  |   | 0.2  | 5  | 14             |   | 2.4 | 5  | 10               |   | 2   | 10 |
| Dibenz(A,H)Anthracene                          | 53-70-3   | 0.036                                                                          | 160                                                                             | 16                                                                                      | 190000                                               | 16                                                                 | mg/kg           | 1.2                | J | 1   | 5  | 0.64               | J | 0.2  | 5  | ND             | U | 2.4 | 5  | ND               | U | 2   | 10 |
| Dibenzofuran                                   | 132-64-9  | 10                                                                             | 260                                                                             | 26                                                                                      | 190000                                               | 26                                                                 | mg/kg           | 3.8                | J | 1   | 5  | 2.2                |   | 0.2  | 5  | 14             |   | 2.4 | 5  | ND               | U | 2   | 10 |
| Diethyl Phthalate                              | 84-66-2   | 8200                                                                           | 2600                                                                            | 260                                                                                     | 10000                                                | 8200                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Dimethyl Phthalate                             | 131-11-3  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Di-N-Butyl Phthalate                           | 84-74-2   | 1000                                                                           | 4100                                                                            | 410                                                                                     | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Di-N-Octylphthalate                            | 117-84-0  | 300                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 2.1 | 5  | ND                 | U | 0.41 | 5  | ND             | U | 4.8 | 5  | ND               | U | 4.1 | 10 |
| Fluoranthene                                   | 206-44-0  | 26                                                                             | 3200                                                                            | 320                                                                                     | 190000                                               | 320                                                                | mg/kg           | 2.3                | J | 1   | 5  | 7.5                |   | 0.2  | 5  | 10             | J | 2.4 | 5  | ND               | U | 2   | 10 |

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |       |    | BH-10-64           |   |       |    | BH-10-65       |   |       |    | BH-10-69         |   |       |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------|----|--------------------|---|-------|----|----------------|---|-------|----|------------------|---|-------|----|
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC 12-14' |   |       |    | BH-10-64-WC 11-13' |   |       |    | BH-10-65 6-8'  |   |       |    | BH-10-69-WC 5-8' |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |       |    | 4/13/2011          |   |       |    | 4/14/2011      |   |       |    | 4/12/2011        |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil         |   |       |    | Waste Soil         |   |       |    | Waste Soil     |   |       |    | Waste Soil       |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 12.0-14.0 ft bgs   |   |       |    | 11.0-13.0 ft bgs   |   |       |    | 6.0-8.0 ft bgs |   |       |    | 5.0-8.0 ft bgs   |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL    | DF | Result             | Q | RL    | DF | Result         | Q | RL    | DF | Result           | Q | RL    | DF |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 380                                                                                     | 190000                                               | 380                                                                | mg/kg           | 6.5                |   | 1     | 5  | 4.3                |   | 0.2   | 5  | 24             |   | 2.4   | 5  | ND               | U | 2     | 10 |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 0.096                                                                                   | 190000                                               | 0.1                                                                | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 3.9                                                                                     | 10000                                                | 3.9                                                                | mg/kg           | ND                 | U | 2.1   | 5  | ND                 | U | 0.41  | 5  | ND             | U | 4.8   | 5  | ND               | U | 4.1   | 10 |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 9.1                                                                                     | 10000                                                | 9.1                                                                | mg/kg           | ND                 | U | 5.2   | 5  | ND                 | U | 1     | 5  | ND             | U | 12    | 5  | ND               | U | 10    | 10 |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 0.056                                                                                   | 640                                                  | 0.1                                                                | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 2800                                                                                    | 190000                                               | 2800                                                               | mg/kg           | 1.2                | J | 1     | 5  | 1.4                |   | 0.2   | 5  | 3.4            | J | 2.4   | 5  | ND               | U | 2     | 10 |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 0.19                                                                                    | 10000                                                | 10                                                                 | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 2.5                                                                                     | 190000                                               | 10                                                                 | mg/kg           | 5.4                |   | 1     | 5  | 8.4                |   | 0.2   | 5  | 110            |   | 2.4   | 5  | 7.3              | J | 2     | 10 |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 0.87                                                                                    | 10000                                                | 20                                                                 | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 0.00051                                                                                 | 10000                                                | 0.037                                                              | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 53                                                                 | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 0.5                                                                                     | 190000                                               | 0.5                                                                | mg/kg           | ND                 | U | 5.2   | 5  | ND                 | U | 1     | 5  | ND             | U | 12    | 5  | ND               | U | 10    | 10 |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 1000                                                                                    | 190000                                               | 1000                                                               | mg/kg           | 14                 |   | 1     | 5  | 14                 |   | 0.2   | 5  | 55             |   | 2.4   | 5  | 7.1              | J | 2     | 10 |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 3.3                                                                                     | 190000                                               | 200                                                                | mg/kg           | ND                 | U | 1     | 5  | ND                 | U | 0.2   | 5  | ND             | U | 2.4   | 5  | ND               | U | 2     | 10 |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 220                                                                                     | 190000                                               | 220                                                                | mg/kg           | 3.9                | J | 1     | 5  | 7.3                |   | 0.2   | 5  | 17             |   | 2.4   | 5  | 4.9              | J | 2     | 10 |
| Metals                    |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                    |   |       |    |                |   |       |    |                  |   |       |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 6070               |   | 6.32  | 1  | 11600              |   | 6.1   | 1  | 10200          |   | 7.29  | 1  | 9620             |   | 6.1   | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 2.7                                                                                     | 190000                                               | 2.7                                                                | mg/kg           | 2.61               |   | 1.26  | 1  | ND                 | U | 1.21  | 1  | 4.55           |   | 1.45  | 1  | ND               | U | 1.21  | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 2.9                                                                                     | 190000                                               | 2.9                                                                | mg/kg           | 12                 |   | 1.19  | 1  | 11                 |   | 1.15  | 1  | 28.3           |   | 1.38  | 1  | 7.18             |   | 1.15  | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 820                                                                                     | 190000                                               | 820                                                                | mg/kg           | 91.6               |   | 0.05  | 1  | 215                |   | 0.049 | 1  | 508            |   | 0.058 | 1  | 157              |   | 0.049 | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 0.426              | J | 0.085 | 1  | 0.648              |   | 0.082 | 1  | 0.49           | J | 0.099 | 1  | 0.158            | J | 0.083 | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 3.8                                                                                     | 190000                                               | 3.8                                                                | mg/kg           | ND                 | U | 0.176 | 1  | 0.175              | J | 0.17  | 1  | 1.05           |   | 0.203 | 1  | ND               | U | 0.17  | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 9710               |   | 7.7   | 1  | 5670               |   | 7.43  | 1  | 12100          |   | 8.88  | 1  | 14000            |   | 7.44  | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 225                |   | 0.741 | 1  | 23.6               |   | 0.715 | 1  | 163            |   | 0.855 | 1  | 32.5             |   | 0.716 | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 14                                                                                      | 190000                                               | 14                                                                 | mg/kg           | 10.7               |   | 0.239 | 1  | 6.67               |   | 0.23  | 1  | 27.7           |   | 0.275 | 1  | 1.28             |   | 0.231 | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 4300                                                                                    | 190000                                               | 4300                                                               | mg/kg           | 275                |   | 0.276 | 1  | 53.2               |   | 0.267 | 1  | 684            |   | 0.319 | 1  | 192              |   | 0.267 | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 65000              |   | 29.6  | 5  | 17500              |   | 5.71  | 1  | 77000          |   | 68.3  | 10 | 6060             |   | 5.71  | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 45                                                                                      | 190000                                               | 45                                                                 | mg/kg           | 161                |   | 0.754 | 1  | 330                |   | 0.727 | 1  | 1500           |   | 4.35  | 5  | 98.2             |   | 0.728 | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 5420               |   | 3.19  | 1  | 2330               |   | 3.08  | 1  | 55100          |   | 3.68  | 1  | 2510             |   | 3.08  | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 200                                                                                     | 190000                                               | 200                                                                | mg/kg           | 707                |   | 0.098 | 1  | 153                |   | 0.095 | 1  | 639            |   | 0.113 | 1  | 32.1             |   | 0.095 | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 1                                                                                       | 190000                                               | 1                                                                  | mg/kg           | 0.67               |   | 0.003 | 1  | ND                 | U | 0.004 | 1  | 1.29           |   | 0.02  | 5  | 0.101            | J | 0.003 | 1  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 65                                                                                      | 190000                                               | 65                                                                 | mg/kg           | 35                 |   | 0.239 | 1  | 15.9               |   | 0.23  | 1  | 332            |   | 0.275 | 1  | 11.4             |   | 0.231 | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 817                |   | 22.6  | 1  | 1510               |   | 21.8  | 1  | 1020           |   | 26.1  | 1  | 448              |   | 21.8  | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 2.6                                                                                     | 190000                                               | 5                                                                  | mg/kg           | ND                 | U | 6.16  | 5  | ND                 | U | 1.19  | 1  | ND             | U | 7.1   | 5  | ND               | U | 1.19  | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 8.4                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 0.226 | 1  | ND                 | U | 0.218 | 1  | 0.299          | J | 0.261 | 1  | ND               | U | 0.218 | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 290                |   | 46.9  | 1  | 276                |   | 45.2  | 1  | 328            |   | 54.1  | 1  | 61.7             | J | 45.3  | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 1.4                                                                                     | 190000                                               | 1.4                                                                | mg/kg           | 1.84               | J | 1.82  | 1  | ND                 | U | 1.76  | 1  | 2.32           | J | 2.1   | 1  | ND               | U | 1.76  | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 7200                                                                                    | 190000                                               | 7200                                                               | mg/kg           | 35.7               |   | 0.239 | 1  | 30.6               |   | 0.23  | 1  | 95.6           |   | 0.275 | 1  | 36.6             |   | 0.231 | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 1200                                                                                    | 190000                                               | 1200                                                               | mg/kg           | 404                |   | 0.829 | 1  | 196                |   | 0.8   | 1  | 2550           |   | 4.78  | 5  | 29.4             |   | 0.801 | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                    |   |       |    |                |   |       |    |                  |   |       |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | %               | 21.2               |   | 0.5   | 1  | 19.1               |   | 0.5   | 1  | 31             |   | 0.5   | 1  | 19.2             |   | 0.5   | 1  |

Notes:  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

Qualifiers:  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

Exceedance Summary:  
10 - RL exceeds the PADEP Non-Residential Soil MSC  
10 - Concentration exceeds the PADEP Non-Residential Soil MSC  
10 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard



Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                 | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-70          |   |       |     | BH-10-77           |   |      |       | BH-10-77           |   |       |       |
|-----------------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|-------------------|---|-------|-----|--------------------|---|------|-------|--------------------|---|-------|-------|
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-70-WC@5'-8' |   |       |     | BH-10-77-WC 10-12' |   |      |       | BH-10-77-WC 6.5-7' |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/11/2011         |   |       |     | 4/13/2011          |   |      |       | 4/13/2011          |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil        |   |       |     | Waste Soil         |   |      |       | Waste Soil         |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 5.0-8.0 ft bgs    |   |       |     | 10.0-12.0 ft bgs   |   |      |       | 6.5-7.0 ft bgs     |   |       |       |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result            | Q | RL    | DF  | Result             | Q | RL   | DF    | Result             | Q | RL    | DF    |
| Volatile Organic Compounds                    |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                   |   |       |     |                    |   |      |       |                    |   |       |       |
| 1,1,1-Trichloroethane                         | 71-55-6    | 20                                                                             | 7.2                                                                             | 0.72                                                                                    | 10000.00                                             | 20                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,1,2,2-Tetrachloroethane                     | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 0.00093                                                                                 | 44                                                   | 0.03                                                               | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane         | 76-13-1    | 10000                                                                          | 10000                                                                           | 1000                                                                                    | 10000                                                | 10000                                                              | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| 1,1,2-Trichloroethane                         | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 0.015                                                                                   | 160                                                  | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,1-Dichloroethane                            | 75-34-3    | 16                                                                             | 3.9                                                                             | 0.39                                                                                    | 1600                                                 | 16                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,1-Dichloroethene                            | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 0.019                                                                                   | 10000                                                | 0.7                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,2,4-Trichlorobenzene                        | 120-82-1   | 7                                                                              | 27                                                                              | 2.7                                                                                     | 10000                                                | 7                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,2-Dibromo-3-Chloropropane                   | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.00092                                                                                 | 0.43                                                 | 0.02                                                               | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| 1,2-Dibromoethane (Ethylene Dibromide)        | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 0.00012                                                                                 | 4.3                                                  | 0.005                                                              | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,2-Dichlorobenzene                           | 95-50-1    | 60                                                                             | 59                                                                              | 5.9                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,2-Dichloroethane                            | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 0.01                                                                                    | 98                                                   | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,2-Dichloropropane                           | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 0.011                                                                                   | 260                                                  | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,3-Dichlorobenzene                           | 541-73-1   | 60                                                                             | 61                                                                              | 6.1                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 1,4-Dichlorobenzene                           | 106-46-7   | 7.5                                                                            | 10                                                                              | 1                                                                                       | 230                                                  | 7.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| 2-Hexanone                                    | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 0.11                                                                                    | 460                                                  | 4.4                                                                | mg/kg           | ND                | U | 0.008 | 1.9 | ND                 | U | 3.5  | 725.7 | ND                 | U | 0.34  | 86.54 |
| Acetone                                       | 67-64-1    | 9200                                                                           | 1000                                                                            | 100                                                                                     | 10000                                                | 9200                                                               | mg/kg           | 0.088             |   | 0.019 | 1.9 | ND                 | U | 8.3  | 725.7 | ND                 | U | 0.79  | 86.54 |
| Benzene                                       | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 0.013                                                                                   | 330                                                  | 0.5                                                                | mg/kg           | 0.024             |   | 0.001 | 1.9 | 2.4                | J | 0.59 | 725.7 | 0.12               | J | 0.056 | 86.54 |
| Bromodichloromethane                          | 75-27-4    | 8                                                                              | 2.7                                                                             | 0.27                                                                                    | 69                                                   | 8                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Bromoform                                     | 75-25-2    | 8                                                                              | 3.5                                                                             | 0.35                                                                                    | 2300                                                 | 8                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Bromomethane                                  | 74-83-9    | 1                                                                              | 0.54                                                                            | 0.054                                                                                   | 460                                                  | 1                                                                  | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Carbon Disulfide                              | 75-15-0    | 620                                                                            | 530                                                                             | 53                                                                                      | 10000                                                | 620                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Carbon Tetrachloride                          | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 0.026                                                                                   | 170                                                  | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Chlorobenzene                                 | 108-90-7   | 10                                                                             | 6.1                                                                             | 0.61                                                                                    | 4600                                                 | 10                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Chloroethane                                  | 75-00-3    | 90                                                                             | 19                                                                              | 1.9                                                                                     | 10000                                                | 90                                                                 | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Chloroform                                    | 67-66-3    | 8                                                                              | 2                                                                               | 0.2                                                                                     | 110                                                  | 8                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Chloromethane                                 | 74-87-3    | 3                                                                              | 0.38                                                                            | 0.038                                                                                   | 1400                                                 | 3                                                                  | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Cis-1,2-Dichloroethylene                      | 156-59-2   | 7                                                                              | 1.6                                                                             | 0.16                                                                                    | 10000                                                | 7                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Cis-1,3-Dichloropropene                       | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Cyclohexane                                   | 110-82-7   | 5300                                                                           | 6900                                                                            | 690                                                                                     | 10000                                                | 5300                                                               | mg/kg           | 0.062             |   | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | 0.32               | J | 0.11  | 86.54 |
| Dibromochloromethane                          | 124-48-1   | 8                                                                              | 2.5                                                                             | 0.25                                                                                    | 95                                                   | 8                                                                  | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Dichlorodifluoromethane                       | 75-71-8    | 100                                                                            | 100                                                                             | 10                                                                                      | 10000                                                | 100                                                                | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Dimethyl Benzene/ Xylenes, Total              | 1330-20-7  | 1000                                                                           | 990                                                                             | 99                                                                                      | 9100                                                 | 1000                                                               | mg/kg           | 0.017             |   | 0.003 | 1.9 | 9.9                |   | 1.2  | 725.7 | 1.5                |   | 0.11  | 86.54 |
| Ethylbenzene                                  | 100-41-4   | 70                                                                             | 46                                                                              | 4.6                                                                                     | 10000                                                | 70                                                                 | mg/kg           | 0.003             | J | 0.003 | 1.9 | 1.5                | J | 1.2  | 725.7 | 0.21               | J | 0.11  | 86.54 |
| Isopropylbenzene (Cumene)                     | 98-82-8    | 350                                                                            | 2500                                                                            | 250                                                                                     | 10000                                                | 350                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | 0.28               | J | 0.11  | 86.54 |
| Methyl Acetate                                | 79-20-9    | 10000                                                                          | 1900                                                                            | 190                                                                                     | 10000                                                | 10000                                                              | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | 0.29               | J | 0.23  | 86.54 |
| Methyl Ethyl Ketone (2-Butanone)              | 78-93-3    | 400                                                                            | 76                                                                              | 7.6                                                                                     | 10000                                                | 400                                                                | mg/kg           | 0.027             |   | 0.011 | 1.9 | ND                 | U | 4.7  | 725.7 | ND                 | U | 0.45  | 86.54 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 108-10-1   | 820                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 820                                                                | mg/kg           | ND                | U | 0.008 | 1.9 | 6.2                | J | 3.5  | 725.7 | ND                 | U | 0.34  | 86.54 |
| Methylcyclohexane                             | 108-87-2   | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 0.079             |   | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | 1.6                |   | 0.11  | 86.54 |
| Methylene Chloride                            | 75-09-2    | 0.5                                                                            | 0.076                                                                           | 0.0076                                                                                  | 5400                                                 | 0.5                                                                | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Styrene                                       | 100-42-5   | 10                                                                             | 24                                                                              | 2.4                                                                                     | 10000                                                | 10                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Tert-Butyl Methyl Ether                       | 1634-04-4  | 2                                                                              | 0.28                                                                            | 0.028                                                                                   | 3700                                                 | 2                                                                  | mg/kg           | ND                | U | 0.001 | 1.9 | ND                 | U | 0.59 | 725.7 | ND                 | U | 0.056 | 86.54 |
| Tetrachloroethylene(PCE)                      | 127-18-4   | 0.5                                                                            | 0.43                                                                            | 0.043                                                                                   | 4400                                                 | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Toluene                                       | 108-88-3   | 100                                                                            | 44                                                                              | 4.4                                                                                     | 10000                                                | 100                                                                | mg/kg           | 0.003             | J | 0.003 | 1.9 | 3.2                | J | 1.2  | 725.7 | 0.21               | J | 0.11  | 86.54 |
| Trans-1,2-Dichloroethene                      | 156-60-5   | 10                                                                             | 2.3                                                                             | 0.23                                                                                    | 5500                                                 | 10                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Trans-1,3-Dichloropropene                     | 10061-02-6 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Trichloroethylene (TCE)                       | 79-01-6    | 0.5                                                                            | 0.17                                                                            | 0.017                                                                                   | 1500                                                 | 0.5                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |
| Trichlorofluoromethane                        | 75-69-4    | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                | U | 0.005 | 1.9 | ND                 | U | 2.4  | 725.7 | ND                 | U | 0.23  | 86.54 |
| Vinyl Chloride                                | 75-01-4    | 0.2                                                                            | 0.027                                                                           | 0.0027                                                                                  | 580                                                  | 0.2                                                                | mg/kg           | ND                | U | 0.003 | 1.9 | ND                 | U | 1.2  | 725.7 | ND                 | U | 0.11  | 86.54 |

Table 7  
Summary of Analytical Results for Waste in CAMU Areas  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-70          |   |     |    | BH-10-77           |   |     |    | BH-10-77           |   |     |    |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|-------------------|---|-----|----|--------------------|---|-----|----|--------------------|---|-----|----|
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-70-WC@5'-8' |   |     |    | BH-10-77-WC 10-12' |   |     |    | BH-10-77-WC 6.5-7' |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/11/2011         |   |     |    | 4/13/2011          |   |     |    | 4/13/2011          |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil        |   |     |    | Waste Soil         |   |     |    | Waste Soil         |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 5.0-8.0 ft bgs    |   |     |    | 10.0-12.0 ft bgs   |   |     |    | 6.5-7.0 ft bgs     |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result            | Q | RL  | DF | Result             | Q | RL  | DF | Result             | Q | RL  | DF |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                   |   |     |    |                    |   |     |    |                    |   |     |    |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 610                                                                                     | 190000                                               | 1000                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2.9                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 0.1                                                                                     | 190000                                               | 2                                                                  | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 0.23                                                                                    | 190000                                               | 20                                                                 | mg/kg           | ND                | U | 29  | 1  | ND                 | U | 13  | 5  | ND                 | U | 22  | 1  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 0.02                                                                                    | 190000                                               | 0.84                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 0.3                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 1800                                                                                    | 190000                                               | 1800                                                               | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 0.44                                                                                    | 10000                                                | 4                                                                  | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 160                                                                                     | 190000                                               | 160                                                                | mg/kg           | ND                | U | 2.9 | 1  | 8.7                |   | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 8.5                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 0.55                                                                                    | 190000                                               | 31                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 1.7                                                                                     | 190000                                               | 82                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 3.2                                                                                     | 190000                                               | 3.2                                                                | mg/kg           | ND                | U | 8.7 | 1  | ND                 | U | 4   | 5  | ND                 | U | 6.5 | 1  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 0.048                                                                                   | 190000                                               | 3.1                                                                | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 0.075                                                                                   | 190000                                               | 1                                                                  | mg/kg           | ND                | U | 14  | 1  | ND                 | U | 6.7 | 5  | ND                 | U | 11  | 1  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 11                                                                                      | 190000                                               | 51                                                                 | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 0.16                                                                                    | 190000                                               | 1.3                                                                | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 1.2                                                                                     | 190000                                               | 51                                                                 | mg/kg           | ND                | U | 5.8 | 1  | 6.2                | J | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 0.19                                                                                    | 190000                                               | 13                                                                 | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 0.41                                                                                    | 190000                                               | 6                                                                  | mg/kg           | ND                | U | 14  | 1  | ND                 | U | 6.7 | 5  | ND                 | U | 11  | 1  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 470                                                                                     | 190000                                               | 470                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 690                                                                                     | 190000                                               | 690                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 54                                                                                      | 10000                                                | 1000                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 35                                                                                      | 190000                                               | 35                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 0.013                                                                                   | 190000                                               | 0.3                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 4.6                                                                                     | 190000                                               | 4.6                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 17                                                                                      | 190000                                               | 17                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 18                                                                                      | 190000                                               | 18                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 61                                                                                      | 190000                                               | 61                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 220                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 0.82                                                                                    | 10000                                                | 31                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 0.0023                                                                                  | 7.7                                                  | 0.076                                                              | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 0.8                                                                                     | 250                                                  | 30                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Bis(2-Ethylhexyl) Phthalate                    | 117-81-7  | 0.6                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 13                                                                 | mg/kg           | ND                | U | 5.8 | 1  | 3.5                | J | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Caprolactam                                    | 105-60-2  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Carbazole                                      | 86-74-8   | 13                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 13                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Chrysene                                       | 218-01-9  | 0.19                                                                           | 230                                                                             | 23                                                                                      | 190000                                               | 23                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Dibenz(A,H)Anthracene                          | 53-70-3   | 0.036                                                                          | 160                                                                             | 16                                                                                      | 190000                                               | 16                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Dibenzofuran                                   | 132-64-9  | 10                                                                             | 260                                                                             | 26                                                                                      | 190000                                               | 26                                                                 | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |
| Diethyl Phthalate                              | 84-66-2   | 8200                                                                           | 2600                                                                            | 260                                                                                     | 10000                                                | 8200                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Dimethyl Phthalate                             | 131-11-3  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Di-N-Butyl Phthalate                           | 84-74-2   | 1000                                                                           | 4100                                                                            | 410                                                                                     | 10000                                                | 1000                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Di-N-Octylphthalate                            | 117-84-0  | 300                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                | U | 5.8 | 1  | ND                 | U | 2.7 | 5  | ND                 | U | 4.4 | 1  |
| Fluoranthene                                   | 206-44-0  | 26                                                                             | 3200                                                                            | 320                                                                                     | 190000                                               | 320                                                                | mg/kg           | ND                | U | 2.9 | 1  | ND                 | U | 1.3 | 5  | ND                 | U | 2.2 | 1  |



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Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-70          |   |       |    | BH-10-77           |   |       |    | BH-10-77           |   |       |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|-------------------|---|-------|----|--------------------|---|-------|----|--------------------|---|-------|----|
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-70-WC@5'-8' |   |       |    | BH-10-77-WC 10-12' |   |       |    | BH-10-77-WC 6.5-7' |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/11/2011         |   |       |    | 4/13/2011          |   |       |    | 4/13/2011          |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Waste Soil        |   |       |    | Waste Soil         |   |       |    | Waste Soil         |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 5.0-8.0 ft bgs    |   |       |    | 10.0-12.0 ft bgs   |   |       |    | 6.5-7.0 ft bgs     |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result            | Q | RL    | DF | Result             | Q | RL    | DF | Result             | Q | RL    | DF |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 380                                                                                     | 190000                                               | 380                                                                | mg/kg           | ND                | U | 2.9   | 1  | 1.5                | J | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 0.096                                                                                   | 190000                                               | 0.1                                                                | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 3.9                                                                                     | 10000                                                | 3.9                                                                | mg/kg           | ND                | U | 5.8   | 1  | ND                 | U | 2.7   | 5  | ND                 | U | 4.4   | 1  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 9.1                                                                                     | 10000                                                | 9.1                                                                | mg/kg           | ND                | U | 14    | 1  | ND                 | U | 6.7   | 5  | ND                 | U | 11    | 1  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 0.056                                                                                   | 640                                                  | 0.1                                                                | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 2800                                                                                    | 190000                                               | 2800                                                               | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Isophorone                | 78-59-3   | 10                                                                             | 1.9                                                                             | 0.19                                                                                    | 10000                                                | 10                                                                 | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 2.5                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                | U | 2.9   | 1  | 4.5                | J | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 0.87                                                                                    | 10000                                                | 20                                                                 | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 0.00051                                                                                 | 10000                                                | 0.037                                                              | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 53                                                                 | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 0.5                                                                                     | 190000                                               | 0.5                                                                | mg/kg           | ND                | U | 14    | 1  | ND                 | U | 6.7   | 5  | ND                 | U | 11    | 1  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 1000                                                                                    | 190000                                               | 1000                                                               | mg/kg           | 3.8               | J | 2.9   | 1  | 4.7                | J | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 3.3                                                                                     | 190000                                               | 200                                                                | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 220                                                                                     | 190000                                               | 220                                                                | mg/kg           | ND                | U | 2.9   | 1  | ND                 | U | 1.3   | 5  | ND                 | U | 2.2   | 1  |
| Metals                    |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                   |   |       |    |                    |   |       |    |                    |   |       |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 153               |   | 7.19  | 1  | 21500              |   | 8.02  | 1  | 1270               |   | 6.31  | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 2.7                                                                                     | 190000                                               | 2.7                                                                | mg/kg           | ND                | U | 1.43  | 1  | ND                 | U | 1.59  | 1  | ND                 | U | 1.26  | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 2.9                                                                                     | 190000                                               | 2.9                                                                | mg/kg           | ND                | U | 1.36  | 1  | 10.9               |   | 1.51  | 1  | 2.14               | J | 1.19  | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 820                                                                                     | 190000                                               | 820                                                                | mg/kg           | 25.3              |   | 0.057 | 1  | 1020               |   | 0.064 | 1  | 62.9               |   | 0.05  | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | ND                | U | 0.097 | 1  | 0.872              |   | 0.108 | 1  | ND                 | U | 0.085 | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 3.8                                                                                     | 190000                                               | 3.8                                                                | mg/kg           | ND                | U | 0.2   | 1  | 1.97               |   | 0.223 | 1  | ND                 | U | 0.176 | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 115               |   | 8.76  | 1  | 16100              |   | 9.77  | 1  | 3610               |   | 7.69  | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 0.926             | J | 0.843 | 1  | 77.4               |   | 0.941 | 1  | 4.81               |   | 0.741 | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 14                                                                                      | 190000                                               | 14                                                                 | mg/kg           | ND                | U | 0.271 | 1  | 9.53               |   | 0.303 | 1  | 0.443              | J | 0.239 | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 4300                                                                                    | 190000                                               | 4300                                                               | mg/kg           | 1.46              |   | 0.314 | 1  | 163                |   | 0.351 | 1  | 3.41               |   | 0.276 | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 219               |   | 6.73  | 1  | 32500              |   | 7.51  | 1  | 2280               |   | 5.91  | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 45                                                                                      | 190000                                               | 45                                                                 | mg/kg           | 7.74              |   | 0.857 | 1  | 208                |   | 0.956 | 1  | 131                |   | 0.753 | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 56.8              |   | 3.63  | 1  | 19400              |   | 4.05  | 1  | 2830               |   | 3.19  | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 200                                                                                     | 190000                                               | 200                                                                | mg/kg           | 2.23              |   | 0.111 | 1  | 399                |   | 0.124 | 1  | 33.5               |   | 0.098 | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 1                                                                                       | 190000                                               | 1                                                                  | mg/kg           | ND                | U | 0.004 | 1  | 24.4               |   | 0.217 | 50 | 0.264              |   | 0.004 | 1  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 65                                                                                      | 190000                                               | 65                                                                 | mg/kg           | 0.997             | J | 0.271 | 1  | 50.2               |   | 0.303 | 1  | 4.97               |   | 0.239 | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 25.7  | 1  | 3290               |   | 28.7  | 1  | 151                |   | 22.6  | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 2.6                                                                                     | 190000                                               | 5                                                                  | mg/kg           | ND                | U | 1.4   | 1  | ND                 | U | 1.56  | 1  | ND                 | U | 1.23  | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 8.4                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                | U | 0.257 | 1  | ND                 | U | 0.287 | 1  | ND                 | U | 0.226 | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                | U | 53.3  | 1  | 1200               |   | 59.5  | 1  | 48.1               | J | 46.8  | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 1.4                                                                                     | 190000                                               | 1.4                                                                | mg/kg           | ND                | U | 2.07  | 1  | ND                 | U | 2.31  | 1  | ND                 | U | 1.82  | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 7200                                                                                    | 190000                                               | 7200                                                               | mg/kg           | 0.706             | J | 0.271 | 1  | 121                |   | 0.303 | 1  | 7.82               |   | 0.239 | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 1200                                                                                    | 190000                                               | 1200                                                               | mg/kg           | 2.22              | J | 0.943 | 1  | 215                |   | 1.05  | 1  | 15.7               |   | 0.828 | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                   |   |       |    |                    |   |       |    |                    |   |       |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | %               | 30.7              |   | 0.5   | 1  | 38.5               |   | 0.5   | 1  | 23.4               |   | 0.5   | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                 | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44                     |   |       |      | BH-10-45                     |   |       |      | BH-10-46                     |   |       |     | BH-10-55                     |   |       |      | BH-10-56                     |   |       |      |
|-----------------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|------------------------------|---|-------|------|------------------------------|---|-------|------|------------------------------|---|-------|-----|------------------------------|---|-------|------|------------------------------|---|-------|------|
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 24-26' 4/12/2011 |   |       |      | BH-10-45-WC 18-20' 4/12/2011 |   |       |      | BH-10-46-WC 17-18' 4/12/2011 |   |       |     | BH-10-55-WC 20-22' 4/12/2011 |   |       |      | BH-10-56-WC 22-24' 4/12/2011 |   |       |      |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil                         |   |       |      | Soil                         |   |       |      | Soil                         |   |       |     | Soil                         |   |       |      | Soil                         |   |       |      |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 24.0-26.0 ft bgs             |   |       |      | 18.0-20.0 ft bgs             |   |       |      | 17.0-18.0 ft bgs             |   |       |     | 20.0-22.0 ft bgs             |   |       |      | 22.0-24.0 ft bgs             |   |       |      |
|                                               |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result                       | Q | RL    | DF   | Result                       | Q | RL    | DF   | Result                       | Q | RL    | DF  | Result                       | Q | RL    | DF   | Result                       | Q | RL    | DF   |
| Volatile Organic Compounds                    |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                              |   |       |      |                              |   |       |      |                              |   |       |     |                              |   |       |      |                              |   |       |      |
| 1,1,1-Trichloroethane                         | 71-55-6    | 20                                                                             | 7.2                                                                             | 0.72                                                                                    | 10000.00                                             | 20                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,1,2,2-Tetrachloroethane                     | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 0.00093                                                                                 | 44                                                   | 0.03                                                               | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane         | 76-13-1    | 10000                                                                          | 10000                                                                           | 1000                                                                                    | 10000                                                | 10000                                                              | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| 1,1,2-Trichloroethane                         | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 0.015                                                                                   | 160                                                  | 0.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,1-Dichloroethane                            | 75-34-3    | 16                                                                             | 3.9                                                                             | 0.39                                                                                    | 1600                                                 | 16                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,1-Dichloroethene                            | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 0.019                                                                                   | 10000                                                | 0.7                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,2,4-Trichlorobenzene                        | 120-82-1   | 7                                                                              | 27                                                                              | 2.7                                                                                     | 10000                                                | 7                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,2-Dibromo-3-Chloropropane                   | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.00092                                                                                 | 0.43                                                 | 0.02                                                               | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| 1,2-Dibromoethane (Ethylene Dibromide)        | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 0.00012                                                                                 | 4.3                                                  | 0.005                                                              | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,2-Dichlorobenzene                           | 95-50-1    | 60                                                                             | 59                                                                              | 5.9                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,2-Dichloroethane                            | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 0.01                                                                                    | 98                                                   | 0.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,2-Dichloropropane                           | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 0.011                                                                                   | 260                                                  | 0.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,3-Dichlorobenzene                           | 541-73-1   | 60                                                                             | 61                                                                              | 6.1                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 1,4-Dichlorobenzene                           | 106-46-7   | 7.5                                                                            | 10                                                                              | 1                                                                                       | 230                                                  | 7.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| 2-Hexanone                                    | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 0.11                                                                                    | 460                                                  | 4.4                                                                | mg/kg           | ND                           | U | 0.31  | 70.5 | ND                           | U | 0.31  | 70.4 | ND                           | U | 0.007 | 1.1 | ND                           | U | 0.29  | 64.7 | ND                           | U | 0.32  | 70.3 |
| Acetone                                       | 67-64-1    | 9200                                                                           | 1000                                                                            | 100                                                                                     | 10000                                                | 9200                                                               | mg/kg           | ND                           | U | 0.73  | 70.5 | ND                           | U | 0.72  | 70.4 | 1.1                          |   | 0.017 | 1.1 | ND                           | U | 0.67  | 64.7 | ND                           | U | 0.74  | 70.3 |
| Benzene                                       | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 0.013                                                                                   | 330                                                  | 0.5                                                                | mg/kg           | 0.098                        | J | 0.052 | 70.5 | 1.2                          |   | 0.051 | 70.4 | 0.058                        |   | 0.001 | 1.1 | 0.12                         | J | 0.048 | 64.7 | 0.16                         | J | 0.053 | 70.3 |
| Bromodichloromethane                          | 75-27-4    | 8                                                                              | 2.7                                                                             | 0.27                                                                                    | 69                                                   | 8                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Bromoform                                     | 75-25-2    | 8                                                                              | 3.5                                                                             | 0.35                                                                                    | 2300                                                 | 8                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Bromomethane                                  | 74-83-9    | 1                                                                              | 0.54                                                                            | 0.054                                                                                   | 460                                                  | 1                                                                  | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| Carbon Disulfide                              | 75-15-0    | 620                                                                            | 530                                                                             | 53                                                                                      | 10000                                                | 620                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | 0.033                        |   | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Carbon Tetrachloride                          | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 0.026                                                                                   | 170                                                  | 0.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Chlorobenzene                                 | 108-90-7   | 10                                                                             | 6.1                                                                             | 0.61                                                                                    | 4600                                                 | 10                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Chloroethane                                  | 75-00-3    | 90                                                                             | 19                                                                              | 1.9                                                                                     | 10000                                                | 90                                                                 | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| Chloroform                                    | 67-66-3    | 8                                                                              | 2                                                                               | 0.2                                                                                     | 110                                                  | 8                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Chloromethane                                 | 74-87-3    | 3                                                                              | 0.38                                                                            | 0.038                                                                                   | 1400                                                 | 3                                                                  | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| Cis-1,2-Dichloroethylene                      | 156-59-2   | 7                                                                              | 1.6                                                                             | 0.16                                                                                    | 10000                                                | 7                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Cis-1,3-Dichloropropene                       | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Cyclohexane                                   | 110-82-7   | 5300                                                                           | 6900                                                                            | 690                                                                                     | 10000                                                | 5300                                                               | mg/kg           | 0.42                         | J | 0.1   | 70.5 | 2                            |   | 0.1   | 70.4 | 0.041                        |   | 0.002 | 1.1 | 0.46                         | J | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Dibromochloromethane                          | 124-48-1   | 8                                                                              | 2.5                                                                             | 0.25                                                                                    | 95                                                   | 8                                                                  | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Dichlorodifluoromethane                       | 75-71-8    | 100                                                                            | 100                                                                             | 10                                                                                      | 10000                                                | 100                                                                | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| Dimethyl Benzene/ Xylenes, Total              | 1330-20-7  | 1000                                                                           | 990                                                                             | 99                                                                                      | 9100                                                 | 1000                                                               | mg/kg           | 0.9                          |   | 0.1   | 70.5 | 2.6                          |   | 0.1   | 70.4 | 0.5                          |   | 0.002 | 1.1 | 0.4                          | J | 0.096 | 64.7 | 0.59                         |   | 0.11  | 70.3 |
| Ethylbenzene                                  | 100-41-4   | 70                                                                             | 46                                                                              | 4.6                                                                                     | 10000                                                | 70                                                                 | mg/kg           | 0.26                         | J | 0.1   | 70.5 | 0.52                         |   | 0.1   | 70.4 | 0.1                          |   | 0.002 | 1.1 | 0.14                         | J | 0.096 | 64.7 | 0.21                         | J | 0.11  | 70.3 |
| Isopropylbenzene (Cumene)                     | 98-82-8    | 350                                                                            | 2500                                                                            | 250                                                                                     | 10000                                                | 350                                                                | mg/kg           | 0.46                         | J | 0.1   | 70.5 | 6.4                          |   | 0.1   | 70.4 | 0.025                        |   | 0.002 | 1.1 | 0.29                         | J | 0.096 | 64.7 | 0.19                         | J | 0.11  | 70.3 |
| Methyl Acetate                                | 79-20-9    | 10000                                                                          | 1900                                                                            | 190                                                                                     | 10000                                                | 10000                                                              | mg/kg           | 0.44                         | J | 0.21  | 70.5 | 0.48                         | J | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | 0.32                         | J | 0.21  | 70.3 |
| Methyl Ethyl Ketone (2-Butanone)              | 78-93-3    | 400                                                                            | 76                                                                              | 7.6                                                                                     | 10000                                                | 400                                                                | mg/kg           | ND                           | U | 0.42  | 70.5 | ND                           | U | 0.41  | 70.4 | 0.26                         |   | 0.01  | 1.1 | ND                           | U | 0.38  | 64.7 | ND                           | U | 0.42  | 70.3 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 108-10-1   | 820                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 820                                                                | mg/kg           | ND                           | U | 0.31  | 70.5 | ND                           | U | 0.31  | 70.4 | ND                           | U | 0.007 | 1.1 | ND                           | U | 0.29  | 64.7 | ND                           | U | 0.32  | 70.3 |
| Methylcyclohexane                             | 108-87-2   | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 4                            |   | 0.1   | 70.5 | 11                           |   | 0.1   | 70.4 | 0.12                         |   | 0.002 | 1.1 | 4.3                          |   | 0.096 | 64.7 | 0.52                         | J | 0.11  | 70.3 |
| Methylene Chloride                            | 75-09-2    | 0.5                                                                            | 0.076                                                                           | 0.0076                                                                                  | 5400                                                 | 0.5                                                                | mg/kg           | ND                           | U | 0.21  | 70.5 | ND                           | U | 0.2   | 70.4 | ND                           | U | 0.005 | 1.1 | ND                           | U | 0.19  | 64.7 | ND                           | U | 0.21  | 70.3 |
| Styrene                                       | 100-42-5   | 10                                                                             | 24                                                                              | 2.4                                                                                     | 10000                                                | 10                                                                 | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           | U | 0.1   | 70.4 | ND                           | U | 0.002 | 1.1 | ND                           | U | 0.096 | 64.7 | ND                           | U | 0.11  | 70.3 |
| Tert-Butyl Methyl Ether                       | 1634-04-4  | 2                                                                              | 0.28                                                                            | 0.028                                                                                   | 3700                                                 | 2                                                                  | mg/kg           | ND                           | U | 0.052 | 70.5 | ND                           | U | 0.051 | 70.4 | ND                           | U | 0.001 | 1.1 | ND                           | U | 0.048 | 64.7 | ND                           | U | 0.053 | 70.3 |
| Tetrachloroethylene(PCE)                      | 127-18-4   | 0.5                                                                            | 0.43                                                                            | 0.043                                                                                   | 4400                                                 | 0.5                                                                | mg/kg           | ND                           | U | 0.1   | 70.5 | ND                           |   |       |      |                              |   |       |     |                              |   |       |      |                              |   |       |      |

Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44           |        |      |    | BH-10-45           |        |      |    | BH-10-46           |        |      |    | BH-10-55           |        |      |    | BH-10-56           |   |      |   |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|--------|------|----|--------------------|--------|------|----|--------------------|--------|------|----|--------------------|--------|------|----|--------------------|---|------|---|
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 24-26' |        |      |    | BH-10-45-WC 18-20' |        |      |    | BH-10-46-WC 17-18' |        |      |    | BH-10-55-WC 20-22' |        |      |    | BH-10-56-WC 22-24' |   |      |   |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/12/2011          |        |      |    | 4/12/2011          |        |      |    | 4/12/2011          |        |      |    | 4/12/2011          |        |      |    | 4/12/2011          |   |      |   |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil               |        |      |    | Soil               |        |      |    | Soil               |        |      |    | Soil               |        |      |    | Soil               |   |      |   |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 24.0-26.0 ft bgs   |        |      |    | 18.0-20.0 ft bgs   |        |      |    | 17.0-18.0 ft bgs   |        |      |    | 20.0-22.0 ft bgs   |        |      |    | 22.0-24.0 ft bgs   |   |      |   |
| Unit                                           | Result    | Q                                                                              | RL                                                                              | DF                                                                                      | Result                                               | Q                                                                  | RL              | DF                 | Result | Q    | RL | DF                 | Result | Q    | RL | DF                 | Result | Q    | RL | DF                 | Result | Q    | RL | DF                 |   |      |   |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |        |      |    |                    |        |      |    |                    |        |      |    |                    |        |      |    |                    |   |      |   |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 610                                                                                     | 190000                                               | 1000                                                               | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2.9                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 0.1                                                                                     | 190000                                               | 2                                                                  | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | 0.63               | J      | 0.49 | 5  | 0.97               | J | 0.5  | 5 |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 0.23                                                                                    | 190000                                               | 20                                                                 | mg/kg           | ND                 | U      | 4.8  | 10 | ND                 | U      | 2.4  | 5  | ND                 | U      | 0.7  | 1  | ND                 | U      | 2.4  | 5  | ND                 | U | 2.5  | 5 |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 0.02                                                                                    | 190000                                               | 0.84                                                               | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 0.3                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 1800                                                                                    | 190000                                               | 1800                                                               | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 0.44                                                                                    | 10000                                                | 4                                                                  | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 160                                                                                     | 190000                                               | 160                                                                | mg/kg           | 21                 |        | 0.48 | 10 | 25                 |        | 0.24 | 5  | 1.8                |        | 0.07 | 1  | 12                 |        | 0.24 | 5  | 17                 |   | 0.25 | 5 |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 8.5                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | 0.53               | J | 0.5  | 5 |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 0.55                                                                                    | 190000                                               | 31                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 1.7                                                                                     | 190000                                               | 82                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 3.2                                                                                     | 190000                                               | 3.2                                                                | mg/kg           | ND                 | U      | 1.5  | 10 | ND                 | U      | 0.72 | 5  | ND                 | U      | 0.21 | 1  | ND                 | U      | 0.73 | 5  | ND                 | U | 0.75 | 5 |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 0.048                                                                                   | 190000                                               | 3.1                                                                | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 0.075                                                                                   | 190000                                               | 1                                                                  | mg/kg           | ND                 | U      | 2.4  | 10 | ND                 | U      | 1.2  | 5  | ND                 | U      | 0.35 | 1  | ND                 | U      | 1.2  | 5  | ND                 | U | 1.2  | 5 |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                            | NS                                                                              | NS                                                                                      | 100                                                  | 0.5                                                                | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 11                                                                                      | 190000                                               | 51                                                                 | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 0.16                                                                                    | 190000                                               | 1.3                                                                | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                            | NS                                                                              | NS                                                                                      | 100                                                  | 0.5                                                                | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 1.2                                                                                     | 190000                                               | 51                                                                 | mg/kg           | 5                  |        | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | 6.7                |        | 0.49 | 5  | 7.2                |   | 0.5  | 5 |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 0.19                                                                                    | 190000                                               | 13                                                                 | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 0.41                                                                                    | 190000                                               | 6                                                                  | mg/kg           | ND                 | U      | 2.4  | 10 | ND                 | U      | 1.2  | 5  | ND                 | U      | 0.35 | 1  | ND                 | U      | 1.2  | 5  | ND                 | U | 1.2  | 5 |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 470                                                                                     | 190000                                               | 470                                                                | mg/kg           | 22                 |        | 0.48 | 10 | 4.9                |        | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 8.7                |        | 0.24 | 5  | 7.3                |   | 0.25 | 5 |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 690                                                                                     | 190000                                               | 690                                                                | mg/kg           | 3.4                |        | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 2.1                |        | 0.24 | 5  | 1.7                |   | 0.25 | 5 |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 54                                                                                      | 10000                                                | 1000                                                               | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 35                                                                                      | 190000                                               | 35                                                                 | mg/kg           | 16                 |        | 0.48 | 10 | 2.8                |        | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 5.9                |        | 0.24 | 5  | 6                  |   | 0.25 | 5 |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 0.013                                                                                   | 190000                                               | 0.3                                                                | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 14                 |        | 0.48 | 10 | 2.8                |        | 0.24 | 5  | 0.11               | J      | 0.07 | 1  | 7.1                |        | 0.24 | 5  | 5.3                |   | 0.25 | 5 |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 4.6                                                                                     | 190000                                               | 4.6                                                                | mg/kg           | 9                  |        | 0.48 | 10 | 2.2                |        | 0.24 | 5  | 0.21               | J      | 0.07 | 1  | 6                  |        | 0.24 | 5  | 4.5                |   | 0.25 | 5 |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 17                                                                                      | 190000                                               | 17                                                                 | mg/kg           | 10                 |        | 0.48 | 10 | 2.6                |        | 0.24 | 5  | 0.076              | J      | 0.07 | 1  | 6.9                |        | 0.24 | 5  | 5.3                |   | 0.25 | 5 |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 18                                                                                      | 190000                                               | 18                                                                 | mg/kg           | 4.3                |        | 0.48 | 10 | 1.2                | J      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 3.1                |        | 0.24 | 5  | 2.5                |   | 0.25 | 5 |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 61                                                                                      | 190000                                               | 61                                                                 | mg/kg           | 5                  |        | 0.48 | 10 | 0.9                | J      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 3.3                |        | 0.24 | 5  | 1.9                |   | 0.25 | 5 |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                 | U      | 0.97 | 10 | ND                 | U      | 0.48 | 5  | ND                 | U      | 0.14 | 1  | ND                 | U      | 0.49 | 5  | ND                 | U | 0.5  | 5 |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 220                                                                                     | 190000                                               | 510                                                                | mg/kg           | 2.8                |        | 0.48 | 10 | 0.63               | J      | 0.24 | 5  | 0.1                | J      | 0.07 | 1  | 1.7                |        | 0.24 | 5  | 2.2                |   | 0.25 | 5 |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 0.82                                                                                    | 10000                                                | 31                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 0.0023                                                                                  | 7.7                                                  | 0.076                                                              | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| Bis(2-Chloroisopropyl) Ether                   | 108-60-1  | 30                                                                             | 8                                                                               | 0.8                                                                                     | 250                                                  | 30                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| Bis(2-Ethylhexyl) Phthalate                    | 117-81-7  | 0.6                                                                            | 130                                                                             | 13                                                                                      | 10000                                                | 13                                                                 | mg/kg           | 1.3                | J      | 0.97 | 10 | 2.1                | J      | 0.48 | 5  | 0.17               | J      | 0.14 | 1  | 1.5                | J      | 0.49 | 5  | 0.58               | J | 0.5  | 5 |
| Caprolactam                                    | 105-60-2  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U      | 0.48 | 10 | ND                 | U      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | ND                 | U      | 0.24 | 5  | ND                 | U | 0.25 | 5 |
| Carbazole                                      | 86-74-8   | 13                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 13                                                                 | mg/kg           | 1.4                | J      | 0.48 | 10 | 0.51               | J      | 0.24 | 5  | ND                 | U      | 0.07 | 1  | 0.82               | J      | 0.24 | 5  | 0.81               | J | 0.25 | 5 |
| Chrysene                                       | 218-01-9  | 0.19                                                                           | 230                                                                             | 23                                                                                      | 190000                                               | 23                                                                 | mg/kg           | 13                 |        | 0.48 | 10 | 3.7                |        | 0.24 | 5  | 0.46               |        | 0.07 | 1  | 7.1                |        | 0.24 | 5  | 6.4                |   | 0.25 | 5 |
| Dibenz(A,H)Anthracene                          | 53-70-3   | 0.036                                                                          | 160                                                                             | 16                                                                                      | 190000                                               | 16                                                                 | mg/kg           | 1.5                | J      | 0.48 | 10 | 0.43               | J      | 0.24 | 5  | ND                 | U      | 0.   |    |                    |        |      |    |                    |   |      |   |

Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-44           |   |       |    | BH-10-45           |   |       |    | BH-10-46           |   |       |    | BH-10-55           |   |       |    | BH-10-56           |   |       |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------|----|--------------------|---|-------|----|--------------------|---|-------|----|--------------------|---|-------|----|--------------------|---|-------|----|
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-44-WC 24-26' |   |       |    | BH-10-45-WC 18-20' |   |       |    | BH-10-46-WC 17-18' |   |       |    | BH-10-55-WC 20-22' |   |       |    | BH-10-56-WC 22-24' |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/12/2011          |   |       |    | 4/12/2011          |   |       |    | 4/12/2011          |   |       |    | 4/12/2011          |   |       |    | 4/12/2011          |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil               |   |       |    | Soil               |   |       |    | Soil               |   |       |    | Soil               |   |       |    | Soil               |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 24.0-26.0 ft bgs   |   |       |    | 18.0-20.0 ft bgs   |   |       |    | 17.0-18.0 ft bgs   |   |       |    | 20.0-22.0 ft bgs   |   |       |    | 22.0-24.0 ft bgs   |   |       |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL    | DF | Result             | Q | RL    | DF | Result             | Q | RL    | DF | Result             | Q | RL    | DF | Result             | Q | RL    | DF |
| Fluoranthene              | 206-44-0  | 26                                                                             | 3200                                                                            | 320                                                                                     | 190000                                               | 320                                                                | mg/kg           | 32                 |   | 0.48  | 10 | 4.6                |   | 0.24  | 5  | 0.089              | J | 0.07  | 1  | 15                 |   | 0.24  | 5  | 12                 |   | 0.25  | 5  |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 380                                                                                     | 190000                                               | 380                                                                | mg/kg           | 17                 |   | 0.48  | 10 | 6.1                |   | 0.24  | 5  | 0.11               | J | 0.07  | 1  | 6.8                |   | 0.24  | 5  | 6.1                |   | 0.25  | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 0.096                                                                                   | 190000                                               | 0.1                                                                | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 3.9                                                                                     | 10000                                                | 3.9                                                                | mg/kg           | ND                 | U | 0.97  | 10 | ND                 | U | 0.48  | 5  | ND                 | U | 0.14  | 1  | ND                 | U | 0.49  | 5  | ND                 | U | 0.5   | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 9.1                                                                                     | 10000                                                | 9.1                                                                | mg/kg           | ND                 | U | 2.4   | 10 | ND                 | U | 1.2   | 5  | ND                 | U | 0.35  | 1  | ND                 | U | 1.2   | 5  | ND                 | U | 1.2   | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 0.056                                                                                   | 640                                                  | 0.1                                                                | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 2800                                                                                    | 190000                                               | 2800                                                               | mg/kg           | 4                  |   | 0.48  | 10 | 1                  | J | 0.24  | 5  | ND                 | U | 0.07  | 1  | 2.9                |   | 0.24  | 5  | 2.1                |   | 0.25  | 5  |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 0.19                                                                                    | 10000                                                | 10                                                                 | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 2.5                                                                                     | 190000                                               | 10                                                                 | mg/kg           | 41                 |   | 0.48  | 10 | 9                  |   | 0.24  | 5  | 1.3                |   | 0.07  | 1  | 27                 |   | 0.24  | 5  | 34                 |   | 2.5   | 50 |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 0.87                                                                                    | 10000                                                | 20                                                                 | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 0.00051                                                                                 | 10000                                                | 0.037                                                              | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 53                                                                 | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | ND                 | U | 0.24  | 5  | ND                 | U | 0.25  | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 0.5                                                                                     | 190000                                               | 0.5                                                                | mg/kg           | ND                 | U | 2.4   | 10 | ND                 | U | 1.2   | 5  | ND                 | U | 0.35  | 1  | ND                 | U | 1.2   | 5  | ND                 | U | 1.2   | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 1000                                                                                    | 190000                                               | 1000                                                               | mg/kg           | 58                 |   | 0.48  | 10 | 20                 |   | 0.24  | 5  | 1.3                |   | 0.07  | 1  | 24                 |   | 0.24  | 5  | 20                 |   | 0.25  | 5  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 3.3                                                                                     | 190000                                               | 200                                                                | mg/kg           | ND                 | U | 0.48  | 10 | ND                 | U | 0.24  | 5  | ND                 | U | 0.07  | 1  | 0.27               | J | 0.24  | 5  | 0.37               | J | 0.25  | 5  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 220                                                                                     | 190000                                               | 220                                                                | mg/kg           | 32                 |   | 0.48  | 10 | 4.6                |   | 0.24  | 5  | 0.2                | J | 0.07  | 1  | 15                 |   | 0.24  | 5  | 13                 |   | 0.25  | 5  |
| Metals                    |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                    |   |       |    |                    |   |       |    |                    |   |       |    |                    |   |       |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 15400              |   | 7.43  | 1  | 21500              |   | 7.32  | 1  | 37400              |   | 10.4  | 1  | 12800              |   | 7.15  | 1  | 15500              |   | 7.28  | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 2.7                                                                                     | 190000                                               | 2.7                                                                | mg/kg           | ND                 | U | 1.48  | 1  | ND                 | U | 1.46  | 1  | ND                 | U | 2.08  | 1  | ND                 | U | 1.42  | 1  | ND                 | U | 1.45  | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 2.9                                                                                     | 190000                                               | 2.9                                                                | mg/kg           | 17.6               |   | 1.4   | 1  | 6.88               |   | 1.38  | 1  | 57.3               |   | 1.97  | 1  | 12.3               |   | 1.35  | 1  | 18                 |   | 1.38  | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 820                                                                                     | 190000                                               | 820                                                                | mg/kg           | 259                |   | 0.059 | 1  | 224                |   | 0.058 | 1  | 1180               |   | 0.083 | 1  | 345                |   | 0.057 | 1  | 245                |   | 0.058 | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 1.41               |   | 0.1   | 1  | 1.19               |   | 0.099 | 1  | 1.04               |   | 0.141 | 1  | 1.45               |   | 0.097 | 1  | 1.61               |   | 0.099 | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 3.8                                                                                     | 190000                                               | 3.8                                                                | mg/kg           | 1.26               |   | 0.207 | 1  | ND                 | U | 0.204 | 1  | 0.897              | J | 0.291 | 1  | 1.56               |   | 0.199 | 1  | 1.66               |   | 0.203 | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 3250               |   | 9.05  | 1  | 4740               |   | 8.92  | 1  | 183000             |   | 63.6  | 5  | 4830               |   | 8.72  | 1  | 4390               |   | 8.88  | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 50.8               |   | 0.871 | 1  | 46.6               |   | 0.859 | 1  | 236                |   | 1.22  | 1  | 47.7               |   | 0.839 | 1  | 50.3               |   | 0.854 | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 14                                                                                      | 190000                                               | 14                                                                 | mg/kg           | 20.2               |   | 0.281 | 1  | 13.1               |   | 0.277 | 1  | 13.3               |   | 0.394 | 1  | 17.9               |   | 0.27  | 1  | 19.7               |   | 0.275 | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 4300                                                                                    | 190000                                               | 4300                                                               | mg/kg           | 103                |   | 0.325 | 1  | 52.7               |   | 0.32  | 1  | 409                |   | 0.457 | 1  | 97.4               |   | 0.313 | 1  | 109                |   | 0.319 | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 23200              |   | 6.96  | 1  | 25200              |   | 6.86  | 1  | 16700              |   | 9.78  | 1  | 21200              |   | 6.7   | 1  | 23300              |   | 6.82  | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 45                                                                                      | 190000                                               | 45                                                                 | mg/kg           | 281                |   | 0.886 | 1  | 159                |   | 0.873 | 1  | 1400               |   | 1.25  | 1  | 304                |   | 0.853 | 1  | 316                |   | 0.869 | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                                                      | #N/A                                                 | NS                                                                 | mg/kg           | 3320               |   | 3.75  | 1  | 6760               |   | 3.7   | 1  | 36600              |   | 5.27  | 1  | 3140               |   | 3.61  | 1  | 3580               |   | 3.68  | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 200                                                                                     | 190000                                               | 200                                                                | mg/kg           | 460                |   | 0.115 | 1  | 449                |   | 0.114 | 1  | 1030               |   | 0.162 | 1  | 369                |   | 0.111 | 1  | 424                |   | 0.113 | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 1                                                                                       | 190000                                               | 1                                                                  | mg/kg           | 0.752              |   | 0.004 | 1  | 0.669              |   | 0.004 | 1  | 0.0304             | J | 0.006 | 1  | 0.735              |   | 0.004 | 1  | 0.906              |   | 0.004 | 1  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 65                                                                                      | 190000                                               | 65                                                                 | mg/kg           | 34.8               |   | 0.281 | 1  | 30.6               |   | 0.277 | 1  | 221                |   | 0.394 | 1  | 32.8               |   | 0.27  | 1  | 35.6               |   | 0.275 | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                                                      | #N/A                                                 | NS                                                                 | mg/kg           | 1710               |   | 26.6  | 1  | 2050               |   | 26.2  | 1  | 243                |   | 37.4  | 1  | 1450               |   | 25.6  | 1  | 1720               |   | 26.1  | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 2.6                                                                                     | 190000                                               | 5                                                                  | mg/kg           | 2.04               | J | 1.45  | 1  | 1.6                | J | 1.43  | 1  | ND                 | U | 2.03  | 1  | 2.76               | J | 1.39  | 1  | 3.57               |   | 1.42  | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 8.4                                                                                     | 190000                                               | 10                                                                 | mg/kg           | 0.496              | J | 0.266 | 1  | ND                 | U | 0.262 | 1  | 1.26               |   | 0.374 | 1  | 0.583              | J | 0.256 | 1  | 0.52               | J | 0.261 | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 167                |   | 55.1  | 1  | 300                |   | 54.3  | 1  | 653                |   | 77.4  | 1  | 215                |   | 53.1  | 1  | 656                |   | 54    | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 1.4                                                                                     | 190000                                               | 1.4                                                                | mg/kg           | ND                 | U | 2.14  | 1  | 3.53               | J | 2.11  | 1  | ND                 | U | 3.01  | 1  | ND                 | U | 2.06  | 1  | ND                 | U | 2.1   | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 7200                                                                                    | 190000                                               | 7200                                                               | mg/kg           | 34                 |   | 0.281 | 1  | 52.3               |   | 0.277 | 1  | 488                |   | 0.394 | 1  | 30.3               |   | 0.27  | 1  | 31.1               |   | 0.275 | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 1200                                                                                    | 190000                                               | 1200                                                               | mg/kg           | 427                |   | 0.975 | 1  | 204                |   | 0.961 | 1  | 570                |   | 1.37  | 1  | 399                |   | 0.939 | 1  | 457                |   | 0.956 | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |    |                    |   |       |    |                    |   |       |    |                    |   |       |    |                    |   |       |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | %               | 32.3               |   | 0.5   | 1  | 31.3               |   | 0.5   | 1  | 52.3               |   | 0.5   | 1  | 32.4               |   | 0.5   | 1  | 33.6               |   | 0.5   | 1  |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
All soil samples in this table are considered saturated soils.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate)

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact

Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No     | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |       |      | BH-10-64           |   |       |    | BH-10-65         |   |       |    | BH-10-69             |   |      |      | BH-10-70             |   |       |      | BH-10-77           |   |       |      |
|----------------------------------------|------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------|------|--------------------|---|-------|----|------------------|---|-------|----|----------------------|---|------|------|----------------------|---|-------|------|--------------------|---|-------|------|
|                                        |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC_21-23' |   |       |      | BH-10-64-WC_24-26' |   |       |    | BH-10-65_14-16'  |   |       |    | BH-10-69-WC_15.5-16' |   |      |      | BH-10-70-WC@15.5-16' |   |       |      | BH-10-77-WC_20-22' |   |       |      |
|                                        |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |       |      | 4/13/2011          |   |       |    | 4/14/2011        |   |       |    | 4/12/2011            |   |      |      | 4/11/2011            |   |       |      | 4/13/2011          |   |       |      |
|                                        |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil               |   |       |      | Soil               |   |       |    | Soil             |   |       |    | Soil                 |   |      |      | Soil                 |   |       |      | Soil               |   |       |      |
|                                        |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 21.0-23.0 ft bgs   |   |       |      | 24.0-26.0 ft bgs   |   |       |    | 14.0-16.0 ft bgs |   |       |    | 15.5-16.0 ft bgs     |   |      |      | 15.5-16.0 ft bgs     |   |       |      | 20.0-22.0 ft bgs   |   |       |      |
|                                        |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL    | DF   | Result             | Q | RL    | DF | Result           | Q | RL    | DF | Result               | Q | RL   | DF   | Result               | Q | RL    | DF   | Result             | Q | RL    | DF   |
| Volatile Organic Compounds             |            |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |       |      |                    |   |       |    |                  |   |       |    |                      |   |      |      |                      |   |       |      |                    |   |       |      |
| 1,1,1-Trichloroethane                  | 71-55-6    | 20                                                                             | 7.2                                                                             | 0.72                                                                                    | 10000.00                                             | 20                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,1,2,2-Tetrachloroethane              | 79-34-5    | 0.03                                                                           | 0.0093                                                                          | 0.00093                                                                                 | 44                                                   | 0.03                                                               | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane  | 76-13-1    | 10000                                                                          | 10000                                                                           | 1000                                                                                    | 10000                                                | 10000                                                              | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| 1,1,2-Trichloroethane                  | 79-00-5    | 0.5                                                                            | 0.15                                                                            | 0.015                                                                                   | 160                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,1-Dichloroethane                     | 75-34-3    | 16                                                                             | 3.9                                                                             | 0.39                                                                                    | 1600                                                 | 16                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,1-Dichloroethene                     | 75-35-4    | 0.7                                                                            | 0.19                                                                            | 0.019                                                                                   | 10000                                                | 0.7                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,2,4-Trichlorobenzene                 | 120-82-1   | 7                                                                              | 27                                                                              | 2.7                                                                                     | 10000                                                | 7                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,2-Dibromo-3-Chloropropane            | 96-12-8    | 0.02                                                                           | 0.0092                                                                          | 0.00092                                                                                 | 0.43                                                 | 0.02                                                               | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4   | 0.005                                                                          | 0.0012                                                                          | 0.00012                                                                                 | 4.3                                                  | 0.005                                                              | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,2-Dichlorobenzene                    | 95-50-1    | 60                                                                             | 59                                                                              | 5.9                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,2-Dichloroethane                     | 107-06-2   | 0.5                                                                            | 0.1                                                                             | 0.01                                                                                    | 98                                                   | 0.5                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,2-Dichloropropane                    | 78-87-5    | 0.5                                                                            | 0.11                                                                            | 0.011                                                                                   | 260                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,3-Dichlorobenzene                    | 541-73-1   | 60                                                                             | 61                                                                              | 6.1                                                                                     | 10000                                                | 60                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 1,4-Dichlorobenzene                    | 106-46-7   | 7.5                                                                            | 10                                                                              | 1                                                                                       | 230                                                  | 7.5                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| 2-Hexanone                             | 591-78-6   | 4.4                                                                            | 1.1                                                                             | 0.11                                                                                    | 460                                                  | 4.4                                                                | mg/kg           | ND                 | U | 0.27  | 62.7 | ND                 | U | 0.005 | 1  | ND               | U | 0.005 | 1  | ND                   | U | 0.36 | 72.3 | ND                   | U | 0.21  | 55.5 | ND                 | U | 0.31  | 69.1 |
| Acetone                                | 67-64-1    | 9200                                                                           | 1000                                                                            | 100                                                                                     | 10000                                                | 9200                                                               | mg/kg           | ND                 | U | 0.62  | 62.7 | 0.14               |   | 0.012 | 1  | 0.16             |   | 0.011 | 1  | ND                   | U | 0.84 | 72.3 | ND                   | U | 0.48  | 55.5 | ND                 | U | 0.73  | 69.1 |
| Benzene                                | 71-43-2    | 0.5                                                                            | 0.13                                                                            | 0.013                                                                                   | 330                                                  | 0.5                                                                | mg/kg           | 0.51               |   | 0.044 | 62.7 | 0.03               |   | 9E-04 | 1  | 0.002            | J | 8E-04 | 1  | 0.12                 | J | 0.06 | 72.3 | 0.35                 |   | 0.034 | 55.5 | ND                 | U | 0.052 | 69.1 |
| Bromodichloromethane                   | 75-27-4    | 8                                                                              | 2.7                                                                             | 0.27                                                                                    | 69                                                   | 8                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Bromoform                              | 75-25-2    | 8                                                                              | 3.5                                                                             | 0.35                                                                                    | 2300                                                 | 8                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Bromomethane                           | 74-83-9    | 1                                                                              | 0.54                                                                            | 0.054                                                                                   | 460                                                  | 1                                                                  | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| Carbon Disulfide                       | 75-15-0    | 620                                                                            | 530                                                                             | 53                                                                                      | 10000                                                | 620                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Carbon Tetrachloride                   | 56-23-5    | 0.5                                                                            | 0.26                                                                            | 0.026                                                                                   | 170                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Chlorobenzene                          | 108-90-7   | 10                                                                             | 6.1                                                                             | 0.61                                                                                    | 4600                                                 | 10                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Chloroethane                           | 75-00-3    | 90                                                                             | 19                                                                              | 1.9                                                                                     | 10000                                                | 90                                                                 | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| Chloroform                             | 67-66-3    | 8                                                                              | 2                                                                               | 0.2                                                                                     | 110                                                  | 8                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Chloromethane                          | 74-87-3    | 3                                                                              | 0.38                                                                            | 0.038                                                                                   | 1400                                                 | 3                                                                  | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| Cis-1,2-Dichloroethylene               | 156-59-2   | 7                                                                              | 1.6                                                                             | 0.16                                                                                    | 10000                                                | 7                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Cis-1,3-Dichloropropene                | 10061-01-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Cyclohexane                            | 110-82-7   | 5300                                                                           | 6900                                                                            | 690                                                                                     | 10000                                                | 5300                                                               | mg/kg           | 1.9                |   | 0.088 | 62.7 | 0.081              |   | 0.002 | 1  | 0.071            |   | 0.002 | 1  | 0.5                  | J | 0.12 | 72.3 | 2.1                  |   | 0.069 | 55.5 | 1.6                |   | 0.1   | 69.1 |
| Dibromochloromethane                   | 124-48-1   | 8                                                                              | 2.5                                                                             | 0.25                                                                                    | 95                                                   | 8                                                                  | mg/kg           | ND                 | U | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | ND               | U | 0.002 | 1  | ND                   | U | 0.12 | 72.3 | ND                   | U | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Dichlorodifluoromethane                | 75-71-8    | 100                                                                            | 100                                                                             | 10                                                                                      | 10000                                                | 100                                                                | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | ND                   | U | 0.24 | 72.3 | ND                   | U | 0.14  | 55.5 | ND                 | U | 0.21  | 69.1 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7  | 1000                                                                           | 990                                                                             | 99                                                                                      | 9100                                                 | 1000                                                               | mg/kg           | 0.23               | J | 0.088 | 62.7 | 0.002              | J | 0.002 | 1  | 0.013            |   | 0.002 | 1  | 0.89                 |   | 0.12 | 72.3 | 3.8                  |   | 0.069 | 55.5 | 0.54               |   | 0.1   | 69.1 |
| Ethylbenzene                           | 100-41-4   | 70                                                                             | 46                                                                              | 4.6                                                                                     | 10000                                                | 70                                                                 | mg/kg           | 0.12               | J | 0.088 | 62.7 | ND                 | U | 0.002 | 1  | 0.002            | J | 0.002 | 1  | 0.31                 | J | 0.12 | 72.3 | 0.78                 |   | 0.069 | 55.5 | ND                 | U | 0.1   | 69.1 |
| Isopropylbenzene (Cumene)              | 98-82-8    | 350                                                                            | 2500                                                                            | 250                                                                                     | 10000                                                | 350                                                                | mg/kg           | 1                  |   | 0.088 | 62.7 | 0.003              | J | 0.002 | 1  | 0.007            | J | 0.002 | 1  | 0.62                 |   | 0.12 | 72.3 | 0.44                 |   | 0.069 | 55.5 | 0.67               |   | 0.1   | 69.1 |
| Methyl Acetate                         | 79-20-9    | 10000                                                                          | 1900                                                                            | 190                                                                                     | 10000                                                | 10000                                                              | mg/kg           | ND                 | U | 0.18  | 62.7 | ND                 | U | 0.004 | 1  | ND               | U | 0.003 | 1  | 0.48                 | J | 0.24 | 72.3 | 0.26                 | J | 0.14  | 55.5 | 0.7                |   | 0.21  | 69.1 |
| Methyl Ethyl Ketone (2-Butanone)       | 78-93-3    | 400                                                                            | 76                                                                              | 7.6                                                                                     | 10000                                                | 400                                                                | mg/kg           | ND                 | U | 0.35  | 62.7 | 0.013              | J | 0.007 | 1  | 0.027            |   | 0.006 | 1  | ND                   |   |      |      |                      |   |       |      |                    |   |       |      |

Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                                  | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |      |    | BH-10-64           |   |      |    | BH-10-65         |   |      |    | BH-10-69             |   |      |    | BH-10-70             |   |      |    | BH-10-77           |   |     |    |
|------------------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|------|----|--------------------|---|------|----|------------------|---|------|----|----------------------|---|------|----|----------------------|---|------|----|--------------------|---|-----|----|
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC_21-23' |   |      |    | BH-10-64-WC_24-26' |   |      |    | BH-10-65_14-16'  |   |      |    | BH-10-69-WC_15.5-16' |   |      |    | BH-10-70-WC@15.5-16' |   |      |    | BH-10-77-WC_20-22' |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |      |    | 4/13/2011          |   |      |    | 4/14/2011        |   |      |    | 4/12/2011            |   |      |    | 4/11/2011            |   |      |    | 4/13/2011          |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil               |   |      |    | Soil               |   |      |    | Soil             |   |      |    | Soil                 |   |      |    | Soil                 |   |      |    | Soil               |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 21.0-23.0 ft bgs   |   |      |    | 24.0-26.0 ft bgs   |   |      |    | 14.0-16.0 ft bgs |   |      |    | 15.5-16.0 ft bgs     |   |      |    | 15.5-16.0 ft bgs     |   |      |    | 20.0-22.0 ft bgs   |   |     |    |
|                                                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL   | DF | Result             | Q | RL   | DF | Result           | Q | RL   | DF | Result               | Q | RL   | DF | Result               | Q | RL   | DF | Result             | Q | RL  | DF |
| Semi-Volatile Organic Compounds                |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |      |    |                    |   |      |    |                  |   |      |    |                      |   |      |    |                      |   |      |    |                    |   |     |    |
| 2,4,5-Trichlorophenol                          | 95-95-4   | 1000                                                                           | 6100                                                                            | 610                                                                                     | 190000                                               | 1000                                                               | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 2,4,6-Trichlorophenol                          | 88-06-2   | 10                                                                             | 29                                                                              | 2.9                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2,4-Dichlorophenol                             | 120-83-2  | 2                                                                              | 1                                                                               | 0.1                                                                                     | 190000                                               | 2                                                                  | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2,4-Dimethylphenol                             | 105-67-9  | 200                                                                            | 87                                                                              | 8.7                                                                                     | 10000                                                | 200                                                                | mg/kg           | 0.85               | J | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 2,4-Dinitrophenol                              | 51-28-5   | 20                                                                             | 2.3                                                                             | 0.23                                                                                    | 190000                                               | 20                                                                 | mg/kg           | ND                 | U | 2.3  | 5  | ND                 | U | 2.9  | 5  | ND               | U | 0.5  | 1  | ND                   | U | 5.4  | 10 | ND                   | U | 4.1  | 10 | ND                 | U | 25  | 5  |
| 2,4-Dinitrotoluene                             | 121-14-2  | 0.84                                                                           | 0.2                                                                             | 0.02                                                                                    | 190000                                               | 0.84                                                               | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 2,6-Dinitrotoluene                             | 606-20-2  | 10                                                                             | 3                                                                               | 0.3                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2-Chloronaphthalene                            | 91-58-7   | 820                                                                            | 18000                                                                           | 1800                                                                                    | 190000                                               | 1800                                                               | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2-Chlorophenol                                 | 95-57-8   | 4                                                                              | 4.4                                                                             | 0.44                                                                                    | 10000                                                | 4                                                                  | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2-Methylnaphthalene                            | 91-57-6   | 41                                                                             | 1600                                                                            | 160                                                                                     | 190000                                               | 160                                                                | mg/kg           | 4                  |   | 0.23 | 5  | ND                 | U | 0.29 | 5  | 0.16             | J | 0.05 | 1  | 28                   |   | 0.54 | 10 | 4.9                  |   | 0.41 | 10 | 3.5                | J | 2.5 | 5  |
| 2-Methylphenol (O-Cresol)                      | 95-48-7   | 510                                                                            | 85                                                                              | 8.5                                                                                     | 190000                                               | 510                                                                | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 2-Nitroaniline                                 | 88-74-4   | 31                                                                             | 5.5                                                                             | 0.55                                                                                    | 190000                                               | 31                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 2-Nitrophenol                                  | 88-75-5   | 82                                                                             | 17                                                                              | 1.7                                                                                     | 190000                                               | 82                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 3,3'-Dichlorobenzidine                         | 91-94-1   | 0.58                                                                           | 32                                                                              | 3.2                                                                                     | 190000                                               | 3.2                                                                | mg/kg           | ND                 | U | 0.69 | 5  | ND                 | U | 0.86 | 5  | ND               | U | 0.15 | 1  | ND                   | U | 1.6  | 10 | ND                   | U | 1.2  | 10 | ND                 | U | 7.5 | 5  |
| 3-Nitroaniline                                 | 99-09-2   | 3.1                                                                            | 0.48                                                                            | 0.048                                                                                   | 190000                                               | 3.1                                                                | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 4,6-Dinitro-2-Methylphenol                     | 534-52-1  | 1                                                                              | 0.75                                                                            | 0.075                                                                                   | 190000                                               | 1                                                                  | mg/kg           | ND                 | U | 1.2  | 5  | ND                 | U | 1.4  | 5  | ND               | U | 0.25 | 1  | ND                   | U | 2.7  | 10 | ND                   | U | 2.1  | 10 | ND                 | U | 13  | 5  |
| 4-Bromophenyl Phenyl Ether                     | 101-55-3  | 0.5                                                                            | NS                                                                              | NS                                                                                      | 100                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 4-Chloro-3-Methylphenol                        | 59-50-7   | 51                                                                             | 110                                                                             | 11                                                                                      | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 4-Chloroaniline                                | 106-47-8  | 1.3                                                                            | 1.6                                                                             | 0.16                                                                                    | 190000                                               | 1.3                                                                | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 4-Chlorophenyl Phenyl Ether                    | 7005-72-3 | 0.5                                                                            | NS                                                                              | NS                                                                                      | 100                                                  | 0.5                                                                | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| 4-Methylphenol (P-Cresol)                      | 106-44-5  | 51                                                                             | 12                                                                              | 1.2                                                                                     | 190000                                               | 51                                                                 | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | 6.4                  |   | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 4-Nitroaniline                                 | 100-01-6  | 13                                                                             | 1.9                                                                             | 0.19                                                                                    | 190000                                               | 13                                                                 | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| 4-Nitrophenol                                  | 100-02-7  | 6                                                                              | 4.1                                                                             | 0.41                                                                                    | 190000                                               | 6                                                                  | mg/kg           | ND                 | U | 1.2  | 5  | ND                 | U | 1.4  | 5  | ND               | U | 0.25 | 1  | ND                   | U | 2.7  | 10 | ND                   | U | 2.1  | 10 | ND                 | U | 13  | 5  |
| Acenaphthene                                   | 83-32-9   | 380                                                                            | 4700                                                                            | 470                                                                                     | 190000                                               | 470                                                                | mg/kg           | 1.2                |   | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 32                   |   | 0.54 | 10 | ND                   | U | 0.41 | 10 | 3.2                | J | 2.5 | 5  |
| Acenaphthylene                                 | 208-96-8  | 610                                                                            | 6900                                                                            | 690                                                                                     | 190000                                               | 690                                                                | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 3.9                  |   | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| Acetophenone                                   | 98-86-2   | 1000                                                                           | 540                                                                             | 54                                                                                      | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | 0.83                 | J | 0.82 | 10 | ND                 | U | 5   | 5  |
| Anthracene                                     | 120-12-7  | 6.6                                                                            | 350                                                                             | 35                                                                                      | 190000                                               | 35                                                                 | mg/kg           | 0.74               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 21                   |   | 0.54 | 10 | ND                   | U | 0.41 | 10 | 5.3                | J | 2.5 | 5  |
| Atrazine                                       | 1912-24-9 | 0.3                                                                            | 0.13                                                                            | 0.013                                                                                   | 190000                                               | 0.3                                                                | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| Benzaldehyde                                   | 100-52-7  | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| Benzo(A)Anthracene                             | 56-55-3   | 0.36                                                                           | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 0.93               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 17                   |   | 0.54 | 10 | 0.78                 | J | 0.41 | 10 | 5.3                | J | 2.5 | 5  |
| Benzo(A)Pyrene                                 | 50-32-8   | 0.02                                                                           | 46                                                                              | 4.6                                                                                     | 190000                                               | 4.6                                                                | mg/kg           | 0.77               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 11                   |   | 0.54 | 10 | 0.85                 | J | 0.41 | 10 | 4.4                | J | 2.5 | 5  |
| Benzo(B)Fluoranthene                           | 205-99-2  | 0.12                                                                           | 170                                                                             | 17                                                                                      | 190000                                               | 17                                                                 | mg/kg           | 0.78               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 13                   |   | 0.54 | 10 | 0.49                 | J | 0.41 | 10 | 3.1                | J | 2.5 | 5  |
| Benzo(G,H,I)Perylene                           | 191-24-2  | 0.026                                                                          | 180                                                                             | 18                                                                                      | 190000                                               | 18                                                                 | mg/kg           | 0.67               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 5.3                  |   | 0.54 | 10 | 0.47                 | J | 0.41 | 10 | 3                  | J | 2.5 | 5  |
| Benzo(K)Fluoranthene                           | 207-08-9  | 0.055                                                                          | 610                                                                             | 61                                                                                      | 190000                                               | 61                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 4.7                  |   | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| Benzyl Butyl Phthalate                         | 85-68-7   | 140                                                                            | 10000                                                                           | 1000                                                                                    | 10000                                                | 1000                                                               | mg/kg           | ND                 | U | 0.46 | 5  | ND                 | U | 0.57 | 5  | ND               | U | 0.1  | 1  | ND                   | U | 1.1  | 10 | ND                   | U | 0.82 | 10 | ND                 | U | 5   | 5  |
| Biphenyl (Diphenyl)                            | 92-52-4   | 510                                                                            | 2200                                                                            | 220                                                                                     | 190000                                               | 510                                                                | mg/kg           | 0.32               | J | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | 3.8                  |   | 0.54 | 10 | 0.65                 | J | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| Bis(2-Chloroethoxy) Methane                    | 111-91-1  | 31                                                                             | 8.2                                                                             | 0.82                                                                                    | 10000                                                | 31                                                                 | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 | 1  | ND                   | U | 0.54 | 10 | ND                   | U | 0.41 | 10 | ND                 | U | 2.5 | 5  |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 111-44-4  | 0.076                                                                          | 0.023                                                                           | 0.0023                                                                                  | 7.7                                                  | 0.076                                                              | mg/kg           | ND                 | U | 0.23 | 5  | ND                 | U | 0.29 | 5  | ND               | U | 0.05 |    |                      |   |      |    |                      |   |      |    |                    |   |     |    |



Table 8  
Summary of Soil Sample Analytical Results for Vertical Delineation Soil Samples Beneath Waste in CAMU  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name             | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater 10th of Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (2 - 15 ft bgs) | PADEP Non-Residential Used Aquifer Saturated Soil MSCs (TDS<2,500) | Location ID     | BH-10-63           |   |             |    | BH-10-64           |   |             |    | BH-10-65         |   |             |    | BH-10-69             |   |             |    | BH-10-70             |   |             |    | BH-10-77           |   |             |    |
|---------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----------------|--------------------|---|-------------|----|--------------------|---|-------------|----|------------------|---|-------------|----|----------------------|---|-------------|----|----------------------|---|-------------|----|--------------------|---|-------------|----|
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample ID       | BH-10-63-WC_21-23' |   |             |    | BH-10-64-WC_24-26' |   |             |    | BH-10-65_14-16'  |   |             |    | BH-10-69-WC_15.5-16' |   |             |    | BH-10-70-WC@15.5-16' |   |             |    | BH-10-77-WC_20-22' |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Date     | 4/13/2011          |   |             |    | 4/13/2011          |   |             |    | 4/14/2011        |   |             |    | 4/12/2011            |   |             |    | 4/11/2011            |   |             |    | 4/13/2011          |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Matrix   | Soil               |   |             |    | Soil               |   |             |    | Soil             |   |             |    | Soil                 |   |             |    | Soil                 |   |             |    | Soil               |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Sample Interval | 21.0-23.0 ft bgs   |   |             |    | 24.0-26.0 ft bgs   |   |             |    | 14.0-16.0 ft bgs |   |             |    | 15.5-16.0 ft bgs     |   |             |    | 15.5-16.0 ft bgs     |   |             |    | 20.0-22.0 ft bgs   |   |             |    |
|                           |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    | Unit            | Result             | Q | RL          | DF | Result             | Q | RL          | DF | Result           | Q | RL          | DF | Result               | Q | RL          | DF | Result               | Q | RL          | DF | Result             | Q | RL          | DF |
| Fluoranthene              | 206-44-0  | 26                                                                             | 3200                                                                            | 320                                                                                     | 190000                                               | 320                                                                | mg/kg           | 0.87               | J | 0.23        | 5  | ND                 | U | 0.29        | 5  | 0.054            | J | 0.05        | 1  | 39                   |   | 0.54        | 10 | ND                   | U | 0.41        | 10 | 3.9                | J | 2.5         | 5  |
| Fluorene                  | 86-73-7   | 190                                                                            | 3800                                                                            | 380                                                                                     | 190000                                               | 380                                                                | mg/kg           | 1.6                |   | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | 22                   |   | 0.54        | 10 | 0.52                 | J | 0.41        | 10 | 4.9                | J | 2.5         | 5  |
| Hexachlorobenzene         | 118-74-1  | 0.1                                                                            | 0.96                                                                            | 0.096                                                                                   | 190000                                               | 0.1                                                                | mg/kg           | ND                 | U | <b>0.23</b> | 5  | ND                 | U | <b>0.29</b> | 5  | ND               | U | 0.05        | 1  | ND                   | U | <b>0.54</b> | 10 | ND                   | U | <b>0.41</b> | 10 | ND                 | U | <b>2.5</b>  | 5  |
| Hexachlorobutadiene       | 87-68-3   | 3.3                                                                            | 39                                                                              | 3.9                                                                                     | 10000                                                | 3.9                                                                | mg/kg           | ND                 | U | 0.46        | 5  | ND                 | U | 0.57        | 5  | ND               | U | 0.1         | 1  | ND                   | U | 1.1         | 10 | ND                   | U | 0.82        | 10 | ND                 | U | <b>5</b>    | 5  |
| Hexachlorocyclopentadiene | 77-47-4   | 5                                                                              | 91                                                                              | 9.1                                                                                     | 10000                                                | 9.1                                                                | mg/kg           | ND                 | U | 1.2         | 5  | ND                 | U | 1.4         | 5  | ND               | U | 0.25        | 1  | ND                   | U | 2.7         | 10 | ND                   | U | 2.1         | 10 | ND                 | U | <b>13</b>   | 5  |
| Hexachloroethane          | 67-72-1   | 0.1                                                                            | 0.56                                                                            | 0.056                                                                                   | 640                                                  | 0.1                                                                | mg/kg           | ND                 | U | <b>0.23</b> | 5  | ND                 | U | <b>0.29</b> | 5  | ND               | U | 0.05        | 1  | ND                   | U | <b>0.54</b> | 10 | ND                   | U | <b>0.41</b> | 10 | ND                 | U | <b>2.5</b>  | 5  |
| Indeno[1,2,3-cd]pyrene    | 193-39-5  | 0.36                                                                           | 28000                                                                           | 2800                                                                                    | 190000                                               | 2800                                                               | mg/kg           | 0.37               | J | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | 4.8                  |   | 0.54        | 10 | ND                   | U | 0.41        | 10 | ND                 | U | 2.5         | 5  |
| Isophorone                | 78-59-1   | 10                                                                             | 1.9                                                                             | 0.19                                                                                    | 10000                                                | 10                                                                 | mg/kg           | ND                 | U | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | ND                   | U | 0.54        | 10 | ND                   | U | 0.41        | 10 | ND                 | U | 2.5         | 5  |
| Naphthalene               | 91-20-3   | 10                                                                             | 25                                                                              | 2.5                                                                                     | 190000                                               | 10                                                                 | mg/kg           | 1.1                | J | 0.23        | 5  | ND                 | U | 0.29        | 5  | 0.063            | J | 0.05        | 1  | <b>52</b>            |   | 0.54        | 10 | 1.6                  | J | 0.41        | 10 | 2.9                | J | 2.5         | 5  |
| Nitrobenzene              | 98-95-3   | 20                                                                             | 8.7                                                                             | 0.87                                                                                    | 10000                                                | 20                                                                 | mg/kg           | ND                 | U | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | ND                   | U | 0.54        | 10 | ND                   | U | 0.41        | 10 | ND                 | U | 2.5         | 5  |
| N-Nitrosodi-N-Propylamine | 621-64-7  | 0.037                                                                          | 0.0051                                                                          | 0.00051                                                                                 | 10000                                                | 0.037                                                              | mg/kg           | ND                 | U | <b>0.23</b> | 5  | ND                 | U | <b>0.29</b> | 5  | ND               | U | <b>0.05</b> | 1  | ND                   | U | <b>0.54</b> | 10 | ND                   | U | <b>0.41</b> | 10 | ND                 | U | <b>2.5</b>  | 5  |
| N-Nitrosodiphenylamine    | 86-30-6   | 53                                                                             | 83                                                                              | 8.3                                                                                     | 190000                                               | 53                                                                 | mg/kg           | ND                 | U | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | ND                   | U | 0.54        | 10 | ND                   | U | 0.41        | 10 | ND                 | U | 2.5         | 5  |
| Pentachlorophenol         | 87-86-5   | 0.1                                                                            | 5                                                                               | 0.5                                                                                     | 190000                                               | 0.5                                                                | mg/kg           | ND                 | U | <b>1.2</b>  | 5  | ND                 | U | <b>1.4</b>  | 5  | ND               | U | 0.25        | 1  | ND                   | U | <b>2.7</b>  | 10 | ND                   | U | <b>2.1</b>  | 10 | ND                 | U | <b>13</b>   | 5  |
| Phenanthrene              | 85-01-8   | 110                                                                            | 10000                                                                           | 1000                                                                                    | 190000                                               | 1000                                                               | mg/kg           | 3.7                |   | 0.23        | 5  | ND                 | U | 0.29        | 5  | 0.13             | J | 0.05        | 1  | 66                   |   | 2.7         | 50 | 2.1                  |   | 0.41        | 10 | 7.3                | J | 2.5         | 5  |
| Phenol                    | 108-95-2  | 200                                                                            | 33                                                                              | 3.3                                                                                     | 190000                                               | 200                                                                | mg/kg           | ND                 | U | 0.23        | 5  | ND                 | U | 0.29        | 5  | ND               | U | 0.05        | 1  | ND                   | U | 0.54        | 10 | ND                   | U | 0.41        | 10 | ND                 | U | 2.5         | 5  |
| Pyrene                    | 129-00-0  | 13                                                                             | 2200                                                                            | 220                                                                                     | 190000                                               | 220                                                                | mg/kg           | 1.6                |   | 0.23        | 5  | ND                 | U | 0.29        | 5  | 0.083            | J | 0.05        | 1  | 42                   |   | 0.54        | 10 | 1.5                  | J | 0.41        | 10 | 13                 | J | 2.5         | 5  |
| Metals                    |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |             |    |                    |   |             |    |                  |   |             |    |                      |   |             |    |                      |   |             |    |                    |   |             |    |
| Aluminum                  | 7429-90-5 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 8110               |   | 6.95        | 1  | 26600              |   | 8.64        | 1  | 25000            |   | 7.56        | 1  | 19100                |   | 8.15        | 1  | 12800                |   | 6.22        | 1  | 25700              |   | 7.57        | 1  |
| Antimony                  | 7440-36-0 | 0.6                                                                            | 27                                                                              | 2.7                                                                                     | 190000                                               | 2.7                                                                | mg/kg           | ND                 | U | 1.38        | 1  | ND                 | U | 1.72        | 1  | ND               | U | 1.5         | 1  | ND                   | U | 1.62        | 1  | ND                   | U | 1.24        | 1  | ND                 | U | 1.5         | 1  |
| Arsenic                   | 7440-38-2 | 1                                                                              | 29                                                                              | 2.9                                                                                     | 190000                                               | 2.9                                                                | mg/kg           | <b>8.88</b>        |   | 1.31        | 1  | <b>7.7</b>         |   | 1.63        | 1  | <b>6.82</b>      |   | 1.43        | 1  | <b>21.7</b>          |   | 1.54        | 1  | <b>3.96</b>          |   | 1.17        | 1  | <b>29.8</b>        |   | 1.43        | 1  |
| Barium                    | 7440-39-3 | 200                                                                            | 8200                                                                            | 820                                                                                     | 190000                                               | 820                                                                | mg/kg           | 140                |   | 0.055       | 1  | 186                |   | 0.069       | 1  | 324              |   | 0.06        | 1  | 308                  |   | 0.065       | 1  | 74.9                 |   | 0.049       | 1  | 114                |   | 0.06        | 1  |
| Beryllium                 | 7440-41-7 | 0.4                                                                            | 320                                                                             | 32                                                                                      | 190000                                               | 32                                                                 | mg/kg           | 0.452              | J | 0.094       | 1  | 1.18               |   | 0.117       | 1  | 1.12             |   | 0.102       | 1  | 1.7                  |   | 0.11        | 1  | 0.59                 | J | 0.084       | 1  | 1.1                |   | 0.102       | 1  |
| Cadmium                   | 7440-43-9 | 0.5                                                                            | 38                                                                              | 3.8                                                                                     | 190000                                               | 3.8                                                                | mg/kg           | 0.229              | J | 0.193       | 1  | ND                 | U | 0.241       | 1  | ND               | U | 0.211       | 1  | 1.67                 |   | 0.227       | 1  | 0.876                |   | 0.173       | 1  | 0.73               | J | 0.211       | 1  |
| Calcium                   | 7440-70-2 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 19200              |   | 8.46        | 1  | 3910               |   | 10.5        | 1  | 4350             |   | 9.22        | 1  | 3760                 |   | 9.93        | 1  | 2120                 |   | 7.58        | 1  | 25900              |   | 9.22        | 1  |
| Chromium, Total           | 7440-47-3 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 42.1               |   | 0.815       | 1  | 51.8               |   | 1.01        | 1  | 51.9             |   | 0.887       | 1  | 71.4                 |   | 0.956       | 1  | 27.3                 |   | 0.729       | 1  | 67.8               |   | 0.888       | 1  |
| Cobalt                    | 7440-48-4 | 3                                                                              | 140                                                                             | 14                                                                                      | 190000                                               | 14                                                                 | mg/kg           | 5.36               |   | 0.262       | 1  | 11.4               |   | 0.326       | 1  | 12               |   | 0.286       | 1  | <b>22</b>            |   | 0.308       | 1  | 6.88                 |   | 0.235       | 1  | 4.7                |   | 0.286       | 1  |
| Copper                    | 7440-50-8 | 100                                                                            | 43000                                                                           | 4300                                                                                    | 190000                                               | 4300                                                               | mg/kg           | 61.3               |   | 0.304       | 1  | 8.22               |   | 0.378       | 1  | 13.1             |   | 0.331       | 1  | 129                  |   | 0.357       | 1  | 10.8                 |   | 0.272       | 1  | 26.1               |   | 0.331       | 1  |
| Iron                      | 7439-89-6 | NS                                                                             | NS                                                                              | NS                                                                                      | 190000                                               | 190000                                                             | mg/kg           | 19500              |   | 6.5         | 1  | 29500              |   | 8.09        | 1  | 29100            |   | 7.08        | 1  | 27200                |   | 7.63        | 1  | 19600                |   | 5.82        | 1  | 18500              |   | 7.09        | 1  |
| Lead                      | 7439-92-1 | 0.5                                                                            | 450                                                                             | 45                                                                                      | 190000                                               | 45                                                                 | mg/kg           | <b>115</b>         |   | 0.829       | 1  | 17.4               |   | 1.03        | 1  | <b>291</b>       |   | 0.902       | 1  | <b>417</b>           |   | 0.972       | 1  | 40.9                 |   | 0.742       | 1  | <b>259</b>         |   | 0.903       | 1  |
| Magnesium                 | 7439-95-4 | NS                                                                             | NS                                                                              | NS                                                                                      | #N/A                                                 | NS                                                                 | mg/kg           | 9560               |   | 3.51        | 1  | 6980               |   | 4.36        | 1  | 7020             |   | 3.82        | 1  | 3990                 |   | 4.12        | 1  | 3870                 |   | 3.14        | 1  | 23000              |   | 3.82        | 1  |
| Manganese                 | 7439-96-5 | 30                                                                             | 2000                                                                            | 200                                                                                     | 190000                                               | 200                                                                | mg/kg           | <b>387</b>         |   | 0.108       | 1  | <b>407</b>         |   | 0.134       | 1  | <b>352</b>       |   | 0.117       | 1  | <b>533</b>           |   | 0.126       | 1  | <b>405</b>           |   | 0.096       | 1  | <b>259</b>         |   | 0.117       | 1  |
| Mercury                   | 7439-97-6 | 0.2                                                                            | 10                                                                              | 1                                                                                       | 190000                                               | 1                                                                  | mg/kg           | <b>2.36</b>        |   | 0.02        | 5  | 0.0127             | J | 0.005       | 1  | 0.0844           | J | 0.004       | 1  | <b>1.03</b>          |   | 0.005       | 1  | 0.0074               | J | 0.003       | 1  | 0.422              |   | 0.004       | 1  |
| Nickel                    | 7440-02-0 | 10                                                                             | 650                                                                             | 65                                                                                      | 190000                                               | 65                                                                 | mg/kg           | <b>67.4</b>        |   | 0.262       | 1  | 27.2               |   | 0.326       | 1  | 29.7             |   | 0.286       | 1  | 41.3                 |   | 0.308       | 1  | 16                   |   | 0.235       | 1  | 17.8               |   | 0.286       | 1  |
| Potassium                 | 7440-09-7 | NS                                                                             | NS                                                                              | NS                                                                                      | #N/A                                                 | NS                                                                 | mg/kg           | 1200               |   | 24.9        | 1  | 2690               |   | 30.9        | 1  | 2320             |   | 27.1        | 1  | 2060                 |   | 29.2        | 1  | 2020                 |   | 22.2        | 1  | 2790               |   | 27.1        | 1  |
| Selenium                  | 7782-49-2 | 5                                                                              | 26                                                                              | 2.6                                                                                     | 190000                                               | 5                                                                  | mg/kg           | ND                 | U | 1.35        | 1  | ND                 | U | 1.68        | 1  | ND               | U | 1.47        | 1  | 2.46                 | J | 1.59        | 1  | ND                   | U | 1.21        | 1  | ND                 | U | 1.47        | 1  |
| Silver                    | 7440-22-4 | 10                                                                             | 84                                                                              | 8.4                                                                                     | 190000                                               | 10                                                                 | mg/kg           | ND                 | U | 0.249       | 1  | 0.832              | J | 0.309       | 1  | ND               | U | 0.271       | 1  | 0.757                | J | 0.292       | 1  | ND                   | U | 0.222       | 1  | ND                 | U | 0.271       | 1  |
| Sodium                    | 7440-23-5 | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | mg/kg           | 491                |   | 51.5        | 1  | 299                |   | 64.1        | 1  | 272              |   | 56.1        | 1  | 203                  |   | 60.4        | 1  | 1150                 |   | 46.1        | 1  | 921                |   | 56.1        | 1  |
| Thallium                  | 7440-28-0 | 0.2                                                                            | 14                                                                              | 1.4                                                                                     | 190000                                               | 1.4                                                                | mg/kg           | ND                 | U | <b>2</b>    | 1  | ND                 | U | <b>2.49</b> | 1  | ND               | U | <b>2.18</b> | 1  | ND                   | U | <b>2.35</b> | 1  | ND                   | U | <b>1.79</b> | 1  | ND                 | U | <b>2.18</b> | 1  |
| Vanadium                  | 7440-62-2 | 72                                                                             | 72000                                                                           | 7200                                                                                    | 190000                                               | 7200                                                               | mg/kg           | 31.1               |   | 0.262       | 1  | 59                 |   | 0.326       | 1  | 55.8             |   | 0.286       | 1  | 40.9                 |   | 0.308       | 1  | 28.7                 |   | 0.235       | 1  | 73                 |   | 0.286       | 1  |
| Zinc                      | 7440-66-6 | 200                                                                            | 12000                                                                           | 1200                                                                                    | 190000                                               | 1200                                                               | mg/kg           | 110                |   | 0.911       | 1  | 66.7               |   | 1.13        | 1  | 91.9             |   | 0.992       | 1  | 544                  |   | 1.07        | 1  | 44.8                 |   | 0.816       | 1  | 136                |   | 0.993       | 1  |
| General Chemistry         |           |                                                                                |                                                                                 |                                                                                         |                                                      |                                                                    |                 |                    |   |             |    |                    |   |             |    |                  |   |             |    |                      |   |             |    |                      |   |             |    |                    |   |             |    |
| Moisture, Percent         | MOIST     | NS                                                                             | NS                                                                              | NS                                                                                      | NS                                                   | NS                                                                 | %               | 29                 |   | 0.5         | 1  | 41.8               |   | 0.5         | 1  | 34.8             |   | 0.5         | 1  | 39.5                 |   | 0.5         | 1  | 19.1                 |   | 0.5         | 1  | 34.2               |   | 0.5         | 1  |

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Table 9  
Summary of Post-Excavation Soil Analytical Results - VGO Release Area  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used Aquifer Soil to Groundwater 100xGW MSCs (TDS<2,500) | PADEP Non-Residential Used Aquifer Soil to Groundwater Generic MSCs (TDS<2,500) | PADEP Non-Residential Direct Contact (0 - 2 ft bgs) | PADEP Non-Residential Used Aquifer Unsaturated Soil MSCs (TDS<2,500) | Location ID     | SS-1      |   |        |      | SS-2      |   |        |      | SS-3      |   |        |      | SS-4      |   |        |      | SS-5      |   |        |      | SS-6      |   |        |      |
|----------------------------------------|-----------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------|-----------|---|--------|------|-----------|---|--------|------|-----------|---|--------|------|-----------|---|--------|------|-----------|---|--------|------|-----------|---|--------|------|
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample ID       | SS-1      |   |        |      | SS-2      |   |        |      | SS-3      |   |        |      | SS-4      |   |        |      | SS-5      |   |        |      | SS-6      |   |        |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Date     | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Matrix   | Soil      |   |        |      | Soil      |   |        |      | Soil      |   |        |      | Soil      |   |        |      | Soil      |   |        |      | Soil      |   |        |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Sample Interval | Grab Soil |   |        |      | Grab Soil |   |        |      | Grab Soil |   |        |      | Grab Soil |   |        |      | Grab Soil |   |        |      | Grab Soil |   |        |      |
|                                        |           |                                                                                |                                                                                 |                                                     |                                                                      | Unit            | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   |
| Volatile Organic Compounds             |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |
| Benzene                                | 71-43-2   | 0.5                                                                            | 0.13                                                                            | 290                                                 | 0.5                                                                  | mg/kg           | 0.01      |   | 0.0006 | 1.11 | 0.008     |   | 0.0006 | 1.01 | 0.01      |   | 0.0006 | 1.06 | 0.01      |   | 0.0005 | 0.9  | 0.005     |   | 0.0004 | 0.83 | 0.028     |   | 0.0005 | 0.84 |
| Ethylbenzene                           | 100-41-4  | 70                                                                             | 46                                                                              | 10000                                               | 70                                                                   | mg/kg           | 0.002     | J | 0.001  | 1.11 | ND        |   | 0.001  | 1.01 | 0.003     | J | 0.001  | 1.06 | 0.023     |   | 0.001  | 0.9  | ND        |   | 0.0009 | 0.83 | 0.002     | J | 0.0009 | 0.84 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                            | 2500                                                                            | 10000                                               | 2500                                                                 | mg/kg           | ND        |   | 0.001  | 1.11 | ND        |   | 0.001  | 1.01 | ND        |   | 0.001  | 1.06 | 0.005     |   | 0.001  | 0.9  | ND        |   | 0.0009 | 0.83 | ND        |   | 0.0009 | 0.84 |
| Naphthalene                            | 91-20-3   | 10                                                                             | 25                                                                              | 56000                                               | 25                                                                   | mg/kg           | 0.06      |   | 0.001  | 1.11 | 0.016     |   | 0.001  | 1.01 | 0.042     |   | 0.001  | 1.06 | 0.77      |   | 0.059  | 52.5 | 0.021     |   | 0.0009 | 0.83 | 0.018     |   | 0.0009 | 0.84 |
| Toluene                                | 108-88-3  | 100                                                                            | 44                                                                              | 10000                                               | 100                                                                  | mg/kg           | 0.013     |   | 0.001  | 1.11 | 0.006     |   | 0.001  | 1.01 | 0.023     |   | 0.001  | 1.06 | 0.033     |   | 0.001  | 0.9  | 0.005     |   | 0.0009 | 0.83 | 0.007     |   | 0.0009 | 0.84 |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                            | 35                                                                              | 560                                                 | 35                                                                   | mg/kg           | 0.23      |   | 0.052  | 1.11 | 0.005     | J | 0.001  | 1.01 | 0.029     |   | 0.001  | 1.06 | 0.65      |   | 0.059  | 52.5 | 0.012     |   | 0.0009 | 0.83 | 0.016     |   | 0.0009 | 0.84 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                            | 9.3                                                                             | 480                                                 | 9.3                                                                  | mg/kg           | 0.45      |   | 0.001  | 48.4 | 0.005     | J | 0.001  | 1.01 | 0.025     |   | 0.001  | 1.06 | 0.19      | J | 0.059  | 52.5 | 0.005     |   | 0.0009 | 0.83 | 0.011     |   | 0.0009 | 0.84 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                           | 990                                                                             | 8000                                                | 1000                                                                 | mg/kg           | 0.011     |   | 0.001  | 1.11 | 0.003     | J | 0.001  | 1.01 | 0.014     |   | 0.001  | 1.06 | 0.18      |   | 0.001  | 0.9  | 0.004     | J | 0.0009 | 0.83 | 0.009     |   | 0.0009 | 0.84 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                              | 0.28                                                                            | 3200                                                | 2                                                                    | mg/kg           | ND        |   | 0.0006 | 1.11 | ND        |   | 0.0006 | 1.01 | ND        |   | 0.0006 | 1.06 | ND        |   | 0.0005 | 0.9  | ND        |   | 0.0004 | 0.83 | 0.002     | J | 0.0005 | 0.84 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                          | 0.0012                                                                          | 3.7                                                 | 0.005                                                                | mg/kg           | ND        |   | 0.001  | 1.11 | ND        |   | 0.001  | 1.01 | ND        |   | 0.001  | 1.06 | ND        |   | 0.001  | 0.9  | ND        |   | 0.0009 | 0.83 | ND        |   | 0.0009 | 0.84 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                            | 0.1                                                                             | 86                                                  | 0.5                                                                  | mg/kg           | ND        |   | 0.001  | 1.11 | ND        |   | 0.001  | 1.01 | ND        |   | 0.001  | 1.06 | ND        |   | 0.001  | 0.9  | ND        |   | 0.0009 | 0.83 | ND        |   | 0.0009 | 0.84 |
| Semi-Volatile Organic Compounds        |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |
| Anthracene                             | 120-12-7  | 6.6                                                                            | 350                                                                             | 190000                                              | 350                                                                  | mg/kg           | 0.75      |   | 0.0072 | 10   | 0.24      |   | 0.0075 | 10   | 0.76      |   | 0.0072 | 10   | 0.55      |   | 0.0075 | 10   | 0.84      |   | 0.0072 | 10   | 0.42      |   | 0.015  | 20   |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                           | 320                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.75      |   | 0.0036 | 10   | 0.53      |   | 0.0037 | 10   | 1.8       |   | 0.018  | 50   | 0.97      |   | 0.0037 | 10   | 1.4       |   | 0.0036 | 10   | 0.69      |   | 0.0073 | 20   |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                           | 46                                                                              | 11                                                  | 11                                                                   | mg/kg           | 0.58      |   | 0.0036 | 10   | 0.48      |   | 0.0037 | 10   | 1.4       |   | 0.018  | 50   | 0.88      |   | 0.0037 | 10   | 1         |   | 0.0036 | 10   | 0.54      |   | 0.0073 | 20   |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                           | 170                                                                             | 110                                                 | 110                                                                  | mg/kg           | 0.76      |   | 0.0029 | 10   | 0.59      | B | 0.003  | 10   | 1.7       |   | 0.014  | 50   | 0.96      |   | 0.003  | 10   | 1.4       |   | 0.0057 | 20   | 0.8       | B | 0.0058 | 20   |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                          | 180                                                                             | 170000                                              | 180                                                                  | mg/kg           | 1.1       |   | 0.022  | 10   | 1         |   | 0.022  | 10   | 2.3       |   | 0.022  | 10   | 1.4       |   | 0.022  | 10   | 1.8       |   | 0.021  | 10   | 0.94      |   | 0.044  | 20   |
| Chrysene                               | 218-01-9  | 0.19                                                                           | 230                                                                             | 11000                                               | 230                                                                  | mg/kg           | 3.1       |   | 0.022  | 10   | 1.7       |   | 0.022  | 10   | 5.5       |   | 0.022  | 10   | 3         |   | 0.022  | 10   | 4.8       |   | 0.021  | 10   | 2.5       |   | 0.044  | 20   |
| Fluorene                               | 86-73-7   | 190                                                                            | 3800                                                                            | 110000                                              | 3800                                                                 | mg/kg           | 1.4       |   | 0.036  | 10   | 0.2       |   | 0.037  | 10   | 0.75      |   | 0.036  | 10   | 0.64      |   | 0.037  | 10   | 1         |   | 0.036  | 10   | 0.46      |   | 0.073  | 20   |
| Phenanthrene                           | 85-01-8   | 110                                                                            | 10000                                                                           | 190000                                              | 10000                                                                | mg/kg           | 3.9       | B | 0.014  | 10   | 0.83      | B | 0.015  | 10   | 3.6       | B | 0.014  | 10   | 2.6       | B | 0.015  | 10   | 4.1       | B | 0.014  | 10   | 1.5       | B | 0.029  | 20   |
| Pyrene                                 | 129-00-0  | 13                                                                             | 2200                                                                            | 84000                                               | 2200                                                                 | mg/kg           | ND        |   | 7.3    | 10   | ND        |   | 1.2    | 10   | 5.6       |   | 0.036  | 10   | ND        |   | 0.0051 | 10   | 4.5       |   | 0.036  | 10   | ND        |   | 2.3    | 20   |
| Metals                                 |           |                                                                                |                                                                                 |                                                     |                                                                      |                 |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |           |   |        |      |
| Lead                                   | 7439-92-1 | 0.5                                                                            | 450                                                                             | 1000                                                | 450                                                                  | mg/kg           | 169       |   | 0.622  | 1    | 209       |   | 0.664  | 1    | 270       |   | 0.648  | 1    | 190       |   | 0.667  | 1    | 233       |   | 0.638  | 1    | 169       |   | 0.651  | 1    |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - RL exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Soil MSC  

10

 - Concentration exceeds the PADEP Non-Residential Direct Contact Standard



Table 9  
Summary of Post-Excavation Soil Analytical Results - VGO Release Area  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential Used<br>Aquifer Soil to<br>Groundwater<br>100xGW MSCs<br>(TDS<2,500) | PADEP Non-Residential Used<br>Aquifer Soil to<br>Groundwater<br>Generic MSCs<br>(TDS<2,500) | PADEP Non-Residential<br>Direct Contact<br>(0 - 2 ft bgs) | PADEP Non-Residential Used<br>Aquifer<br>Unsaturated Soil<br>MSCs<br>(TDS<2,500) | Location ID     | SS-7      |   |        |     | SS-8      |   |        |      | SS-9      |   |        |      | SS-10     |   |        |    |
|----------------------------------------|-----------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|-----------|---|--------|-----|-----------|---|--------|------|-----------|---|--------|------|-----------|---|--------|----|
|                                        |           |                                                                                            |                                                                                             |                                                           |                                                                                  | Sample ID       | SS-7      |   |        |     | SS-8      |   |        |      | SS-9      |   |        |      | SS-10     |   |        |    |
|                                        |           |                                                                                            |                                                                                             |                                                           |                                                                                  | Sample Date     | 4/15/2011 |   |        |     | 4/15/2011 |   |        |      | 4/15/2011 |   |        |      | 4/15/2011 |   |        |    |
|                                        |           |                                                                                            |                                                                                             |                                                           |                                                                                  | Sample Matrix   | Soil      |   |        |     | Soil      |   |        |      | Soil      |   |        |      | Soil      |   |        |    |
|                                        |           |                                                                                            |                                                                                             |                                                           |                                                                                  | Sample Interval | Grab Soil |   |        |     | Grab Soil |   |        |      | Grab Soil |   |        |      | Grab Soil |   |        |    |
|                                        |           |                                                                                            |                                                                                             |                                                           |                                                                                  | Unit            | Result    | Q | MDL    | DF  | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF   | Result    | Q | MDL    | DF |
| Volatile Organic Compounds             |           |                                                                                            |                                                                                             |                                                           |                                                                                  |                 |           |   |        |     |           |   |        |      |           |   |        |      |           |   |        |    |
| Benzene                                | 71-43-2   | 0.5                                                                                        | 0.13                                                                                        | 290                                                       | 0.5                                                                              | mg/kg           | 0.007     |   | 0.0006 | 1.1 | 0.001     | J | 0.0005 | 0.99 | 0.002     | J | 0.0005 | 1.02 | 0.003     | J | 0.0005 | 1  |
| Ethylbenzene                           | 100-41-4  | 70                                                                                         | 46                                                                                          | 10000                                                     | 70                                                                               | mg/kg           | 0.002     | J | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | ND        |   | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 350                                                                                        | 2500                                                                                        | 10000                                                     | 2500                                                                             | mg/kg           | 0.003     | J | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | ND        |   | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| Naphthalene                            | 91-20-3   | 10                                                                                         | 25                                                                                          | 56000                                                     | 25                                                                               | mg/kg           | 0.048     |   | 0.001  | 1.1 | 0.002     | J | 0.001  | 0.99 | 0.011     |   | 0.001  | 1.02 | 0.002     | J | 0.001  | 1  |
| Toluene                                | 108-88-3  | 100                                                                                        | 44                                                                                          | 10000                                                     | 100                                                                              | mg/kg           | 0.001     | J | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | 0.001     | J | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 6.2                                                                                        | 35                                                                                          | 560                                                       | 35                                                                               | mg/kg           | 0.22      |   | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | 0.006     |   | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 5.3                                                                                        | 9.3                                                                                         | 480                                                       | 9.3                                                                              | mg/kg           | 0.086     |   | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | 0.002     | J | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 1000                                                                                       | 990                                                                                         | 8000                                                      | 1000                                                                             | mg/kg           | 0.024     |   | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | 0.001     | J | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 2                                                                                          | 0.28                                                                                        | 3200                                                      | 2                                                                                | mg/kg           | ND        |   | 0.0006 | 1.1 | ND        |   | 0.0005 | 0.99 | ND        |   | 0.0005 | 1.02 | ND        |   | 0.0005 | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.005                                                                                      | 0.0012                                                                                      | 3.7                                                       | 0.005                                                                            | mg/kg           | ND        |   | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | ND        |   | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 0.5                                                                                        | 0.1                                                                                         | 86                                                        | 0.5                                                                              | mg/kg           | ND        |   | 0.001  | 1.1 | ND        |   | 0.001  | 0.99 | ND        |   | 0.001  | 1.02 | ND        |   | 0.001  | 1  |
| Semi-Volatile Organic Compounds        |           |                                                                                            |                                                                                             |                                                           |                                                                                  |                 |           |   |        |     |           |   |        |      |           |   |        |      |           |   |        |    |
| Anthracene                             | 120-12-7  | 6.6                                                                                        | 350                                                                                         | 190000                                                    | 350                                                                              | mg/kg           | 0.16      |   | 0.0078 | 10  | 0.2       |   | 0.0068 | 10   | 0.15      |   | 0.0068 | 10   | 0.17      |   | 0.0067 | 10 |
| Benzo(A)Anthracene                     | 56-55-3   | 0.36                                                                                       | 320                                                                                         | 110                                                       | 110                                                                              | mg/kg           | 0.3       |   | 0.0039 | 10  | 0.27      |   | 0.0034 | 10   | 0.42      |   | 0.0034 | 10   | 0.35      |   | 0.0034 | 10 |
| Benzo(A)Pyrene                         | 50-32-8   | 0.02                                                                                       | 46                                                                                          | 11                                                        | 11                                                                               | mg/kg           | 0.3       |   | 0.0039 | 10  | 0.27      |   | 0.0034 | 10   | 0.43      |   | 0.0034 | 10   | 0.41      |   | 0.0034 | 10 |
| Benzo(B)Fluoranthene                   | 205-99-2  | 0.12                                                                                       | 170                                                                                         | 110                                                       | 110                                                                              | mg/kg           | 0.39      |   | 0.0031 | 10  | 0.34      | B | 0.0027 | 10   | 0.47      | B | 0.0027 | 10   | 0.43      |   | 0.0027 | 10 |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.026                                                                                      | 180                                                                                         | 170000                                                    | 180                                                                              | mg/kg           | 0.79      |   | 0.023  | 10  | 0.55      |   | 0.02   | 10   | 0.81      |   | 0.02   | 10   | 0.82      |   | 0.02   | 10 |
| Chrysene                               | 218-01-9  | 0.19                                                                                       | 230                                                                                         | 11000                                                     | 230                                                                              | mg/kg           | 0.79      |   | 0.023  | 10  | 0.9       |   | 0.02   | 10   | 0.98      |   | 0.02   | 10   | 1         |   | 0.02   | 10 |
| Fluorene                               | 86-73-7   | 190                                                                                        | 3800                                                                                        | 110000                                                    | 3800                                                                             | mg/kg           | 0.23      |   | 0.039  | 10  | 0.29      |   | 0.034  | 10   | 0.19      |   | 0.034  | 10   | 0.26      |   | 0.034  | 10 |
| Phenanthrene                           | 85-01-8   | 110                                                                                        | 10000                                                                                       | 190000                                                    | 10000                                                                            | mg/kg           | 0.79      | B | 0.016  | 10  | 1.3       | B | 0.014  | 10   | 1.1       | B | 0.014  | 10   | 1.2       | B | 0.013  | 10 |
| Pyrene                                 | 129-00-0  | 13                                                                                         | 2200                                                                                        | 84000                                                     | 2200                                                                             | mg/kg           | 0.74      |   | 0.039  | 10  | ND        |   | 0.55   | 10   | 0.89      |   | 0.034  | 10   | 0.8       |   | 0.034  | 10 |
| Metals                                 |           |                                                                                            |                                                                                             |                                                           |                                                                                  |                 |           |   |        |     |           |   |        |      |           |   |        |      |           |   |        |    |
| Lead                                   | 7439-92-1 | 0.5                                                                                        | 450                                                                                         | 1000                                                      | 450                                                                              | mg/kg           | 440       |   | 0.671  | 1   | 96.8      |   | 0.61   | 1    | 111       |   | 0.592  | 1    | 116       |   | 0.601  | 1  |

Notes:

DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

Qualifiers:

Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

Exceedance Summary:

- 10**
- RL exceeds the PADEP Non-Residential Soil MSC
- 10**
- Concentration exceeds the PADEP Non-Residential Soil MSC
- 10**
- Concentration exceeds the PADEP Non-Residential Direct Contact Standard

Table 10  
Summary of Shallow Groundwater Analytical Results  
April 2011  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential<br>Used Aquifer MSC for<br>Groundwater TDS<2,500 | Location      | W-1          |   |        |    | W-2          |   |        |    | W-5          |   |        |    | W-6          |   |        |    | W-11          |   |        |    | W-12          |   |        |    | W-15          |   |        |    |
|----------------------------------------|-----------|------------------------------------------------------------------------|---------------|--------------|---|--------|----|--------------|---|--------|----|--------------|---|--------|----|--------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|
|                                        |           |                                                                        | Sample ID     | W-1_04272011 |   |        |    | W-2_04262011 |   |        |    | W-5_04262011 |   |        |    | W-6_04262011 |   |        |    | W-11_04262011 |   |        |    | W-12_04262011 |   |        |    | W-15_04262011 |   |        |    |
|                                        |           |                                                                        | Sample Date   | 4/27/2011    |   |        |    | 4/26/2011    |   |        |    | 4/26/2011    |   |        |    | 4/26/2011    |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    |               |   |        |    |
|                                        |           |                                                                        | Sample Matrix | Groundwater  |   |        |    | Groundwater  |   |        |    | Groundwater  |   |        |    | Groundwater  |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    |               |   |        |    |
|                                        |           |                                                                        | Unit          | Result       | Q | RL     | DF | Result       | Q | RL     | DF | Result       | Q | RL     | DF | Result       | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF |
| Volatile Organic Compounds             |           |                                                                        |               |              |   |        |    |              |   |        |    |              |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 62                                                                     | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 4             |   | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.05                                                                   | ug/l          | ND           | U | 0.0095 | 1  | ND           | U | 0.0095 | 1  | ND           | U | 0.0095 | 1  | ND           | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 5                                                                      | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 53                                                                     | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Benzene                                | 71-43-2   | 5                                                                      | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 8             |   | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Ethylbenzene                           | 100-41-4  | 700                                                                    | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 3             |   | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 3500                                                                   | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 2             |   | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 20                                                                     | ug/l          | 2            |   | 0.5    | 1  | ND           | U | 0.5    | 1  | 3            |   | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Toluene                                | 108-88-3  | 1000                                                                   | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 1             |   | 0.5    | 1  | 0.8           | J | 0.5    | 1  |
| Xylenes (Total)                        | 1330-20-7 | 10000                                                                  | ug/l          | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 10            |   | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Semi Volatile Organic Compounds        |           |                                                                        |               |              |   |        |    |              |   |        |    |              |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Chrysene                               | 218-01-9  | 1.9                                                                    | ug/l          | 20           |   | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 1      | 1  | 1             | J | 1      | 1  |
| Fluorene                               | 86-73-7   | 1900                                                                   | ug/l          | 13           |   | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 1      | 1  | ND            | U | 1      | 1  |
| Naphthalene                            | 91-20-3   | 100                                                                    | ug/l          | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 1      | 1  | ND            | U | 1      | 1  |
| Phenanthrene                           | 85-01-8   | 1100                                                                   | ug/l          | 13           |   | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Pyrene                                 | 129-00-0  | 130                                                                    | ug/l          | 37           |   | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | 2             | J | 1      | 1  | 2             | J | 1      | 1  |
| Metals                                 |           |                                                                        |               |              |   |        |    |              |   |        |    |              |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Lead (Dissolved)                       | 7439-92-1 | 5                                                                      | ug/l          | ND           | U | 0.052  | 1  | ND           | U | 0.052  | 1  | ND           | U | 0.052  | 1  | 0.072        | J | 0.052  | 1  | ND            | U | 0.052  | 1  | 0.18          | J | 0.052  | 1  | 0.96          | J | 0.052  | 1  |

**Notes:**  
DF - Dilution Factor  
PADEP - Pennsylvania Department of Environmental Protection  
ug/l - Micrograms per liter  
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater  
RL - Reporting limit (limit of quantitation)  
ND - Not detected

**Qualifiers:**  
Q - Qualifier  
U - Analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  
**10** - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500  
**10** - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 10  
Summary of Shallow Groundwater Analytical Results  
April 2011  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential<br>Used Aquifer MSC for<br>Groundwater TDS<2,500 | Location      | W-16          |   |        |    | W-17          |   |        |    | W-20          |   |        |    | W-22          |   |        |    | W-23          |   |        |    | W-25          |   |        |    | W-27          |   |        |    |
|----------------------------------------|-----------|------------------------------------------------------------------------|---------------|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|
|                                        |           |                                                                        | Sample ID     | W-16 04272011 |   |        |    | W-17 04272011 |   |        |    | W-20 04272011 |   |        |    | W-22 04272011 |   |        |    | W-23 04272011 |   |        |    | W-25 04262011 |   |        |    | W-27 04262011 |   |        |    |
|                                        |           |                                                                        | Sample Date   | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    |
|                                        |           |                                                                        | Sample Matrix | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    |
|                                        |           |                                                                        | Unit          | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF |
| Volatile Organic Compounds             |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 62                                                                     | ug/l          | ND            | U | 0.5    | 1  | 0.9           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 8             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.05                                                                   | ug/l          | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 5                                                                      | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 53                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 2             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Benzene                                | 71-43-2   | 5                                                                      | ug/l          | 0.6           | J | 0.5    | 1  | 0.9           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 12            |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Ethylbenzene                           | 100-41-4  | 700                                                                    | ug/l          | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 1             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 3500                                                                   | ug/l          | 26            |   | 0.5    | 1  | 43            |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 1             | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 20                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Toluene                                | 108-88-3  | 1000                                                                   | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 2             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Xylenes (Total)                        | 1330-20-7 | 10000                                                                  | ug/l          | 0.6           | J | 0.5    | 1  | 3             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 13            |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Semi Volatile Organic Compounds        |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Chrysene                               | 218-01-9  | 1.9                                                                    | ug/l          | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Fluorene                               | 86-73-7   | 1900                                                                   | ug/l          | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 1      | 1  | 1             | J | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Naphthalene                            | 91-20-3   | 100                                                                    | ug/l          | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | 3             | J | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Phenanthrene                           | 85-01-8   | 1100                                                                   | ug/l          | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Pyrene                                 | 129-00-0  | 130                                                                    | ug/l          | ND            | U | 1      | 1  | 1             | J | 1      | 1  | ND            | U | 1      | 1  | 2             | J | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  |
| Metals                                 |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Lead (Dissolved)                       | 7439-92-1 | 5                                                                      | ug/l          | 0.18          | J | 0.052  | 1  | 0.084         | J | 0.052  | 1  | 3.2           | 0 | 0.052  | 1  | 0.2           | J | 0.052  | 1  | ND            | U | 0.052  | 1  | ND            | U | 0.052  | 1  | 0.11          | J | 0.052  | 1  |

**Notes:**  
DF - Dilution Factor  
PADEP - Pennsylvania Department of Environmental Protection  
ug/l - Micrograms per liter  
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater  
RL - Reporting limit (limit of quantitation)  
ND - Not detected

**Qualifiers:**  
Q - Qualifier  
U - Analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500  

10

 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 10  
Summary of Shallow Groundwater Analytical Results  
April 2011  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential<br>Used Aquifer MSC for<br>Groundwater TDS<2,500 | Location      | W-28          |   |        |    | W-29          |   |        |    | W-30          |   |        |    | W-31          |   |        |    | W-32          |   |        |    | W-33          |   |        |    | W-34          |   |        |    |
|----------------------------------------|-----------|------------------------------------------------------------------------|---------------|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|
|                                        |           |                                                                        | Sample ID     | W-28 04262011 |   |        |    | W-29 04262011 |   |        |    | W-30 04262011 |   |        |    | W-31 04262011 |   |        |    | W-32 04272011 |   |        |    | W-33 04272011 |   |        |    | W-34 04272011 |   |        |    |
|                                        |           |                                                                        | Sample Date   | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    | 4/27/2011     |   |        |    |
|                                        |           |                                                                        | Sample Matrix | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    |
|                                        |           |                                                                        | Unit          | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF |
| Volatile Organic Compounds             |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 62                                                                     | ug/l          | 1             | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 28            |   | 0.5    | 1  | 6             |   | 0.5    | 1  | 36            |   | 5      | 10 | 9             |   | 0.5    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.05                                                                   | ug/l          | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 5                                                                      | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 2             |   | 0.5    | 1  | ND            | U | 5      | 10 | ND            | U | 0.5    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 53                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 9             |   | 0.5    | 1  | 1             | J | 0.5    | 1  | 11            | J | 5      | 10 | 2             |   | 0.5    | 1  |
| Benzene                                | 71-43-2   | 5                                                                      | ug/l          | 0.5           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 10            |   | 0.5    | 1  | 56            |   | 0.5    | 1  | 250           |   | 5      | 10 | 7             |   | 0.5    | 1  |
| Ethylbenzene                           | 100-41-4  | 700                                                                    | ug/l          | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 5             |   | 0.5    | 1  | 1             |   | 0.5    | 1  | 13            |   | 5      | 10 | 2             |   | 0.5    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 3500                                                                   | ug/l          | 23            |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 9             |   | 0.5    | 1  | 8             |   | 0.5    | 1  | ND            | U | 5      | 10 | 1             | J | 0.5    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 20                                                                     | ug/l          | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 5      | 10 | ND            | U | 0.5    | 1  |
| Toluene                                | 108-88-3  | 1000                                                                   | ug/l          | 0.8           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 4             |   | 0.5    | 1  | 1             |   | 0.5    | 1  | 60            |   | 5      | 10 | 11            |   | 0.5    | 1  |
| Xylenes (Total)                        | 1330-20-7 | 10000                                                                  | ug/l          | 1             |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 21            |   | 0.5    | 1  | 4             |   | 0.5    | 1  | 70            |   | 5      | 10 | 19            |   | 0.5    | 1  |
| Semi Volatile Organic Compounds        |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Chrysene                               | 218-01-9  | 1.9                                                                    | ug/l          | 2             | J | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | 4             | J | 1      | 1  | 4             | J | 1      | 1  | 6             |   | 1      | 1  | ND            | U | 1      | 1  |
| Fluorene                               | 86-73-7   | 1900                                                                   | ug/l          | 12            |   | 1      | 1  | 1             | J | 0.9    | 1  | ND            | U | 1      | 1  | 5             | J | 1      | 1  | 12            |   | 1      | 1  | 36            |   | 1      | 1  | 5             | J | 1      | 1  |
| Naphthalene                            | 91-20-3   | 100                                                                    | ug/l          | 3             | J | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | 13            |   | 1      | 1  | 24            |   | 1      | 1  | 330           |   | 5      | 5  | 11            |   | 1      | 1  |
| Phenanthrene                           | 85-01-8   | 1100                                                                   | ug/l          | 21            |   | 1      | 1  | 2             | J | 0.9    | 1  | ND            | U | 1      | 1  | 17            |   | 1      | 1  | 13            |   | 1      | 1  | 66            |   | 1      | 1  | 10            |   | 1      | 1  |
| Pyrene                                 | 129-00-0  | 130                                                                    | ug/l          | 8             |   | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | 9             |   | 1      | 1  | 6             |   | 1      | 1  | 16            |   | 1      | 1  | 1             | J | 1      | 1  |
| Metals                                 |           |                                                                        |               |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Lead (Dissolved)                       | 7439-92-1 | 5                                                                      | ug/l          | 0.19          | J | 0.052  | 1  | ND            | U | 0.052  | 1  | 0.13          | J | 0.052  | 1  | 6             | 0 | 0.052  | 1  | 0.37          | J | 0.052  | 1  | 0.068         | J | 0.052  | 1  | ND            | U | 0.052  | 1  |

**Notes:**  
DF - Dilution Factor  
PADEP - Pennsylvania Department of Environmental Protection  
ug/l - Micrograms per liter  
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater  
RL - Reporting limit (limit of quantitation)  
ND - Not detected

**Qualifiers:**  
Q - Qualifier  
U - Analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  
**10** - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500  
**10** - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 11  
Summary of Intermediate Groundwater Analytical Results  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PADEP Non-Residential<br>Used Aquifer MSC for<br>Groundwater TDS<2,500 | Location      | W-1D          |   |        |    | W-9          |   |        |    | W-13          |   |        |    | W-19          |   |        |    | W-26          |   |        |    | W-32D          |   |        |    |
|----------------------------------------|-----------|------------------------------------------------------------------------|---------------|---------------|---|--------|----|--------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|----------------|---|--------|----|
|                                        |           |                                                                        | Sample ID     | W-1D_04262011 |   |        |    | W-9_04262011 |   |        |    | W-13_04262011 |   |        |    | W-19_04272011 |   |        |    | W-26_04262011 |   |        |    | W-32D_04272011 |   |        |    |
|                                        |           |                                                                        | Sample Date   | 4/26/2011     |   |        |    | 4/26/2011    |   |        |    | 4/26/2011     |   |        |    | 4/27/2011     |   |        |    | 4/26/2011     |   |        |    | 4/27/2011      |   |        |    |
|                                        |           |                                                                        | Sample Matrix | Groundwater   |   |        |    | Groundwater  |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater    |   |        |    |
|                                        |           |                                                                        | Unit          | Result        | Q | RL     | DF | Result       | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result         | Q | RL     | DF |
| Volatile Organic Compounds             |           |                                                                        |               |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |                |   |        |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 62                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.05                                                                   | ug/l          | ND            | U | 0.0095 | 1  | ND           | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND             | U | 0.0094 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 5                                                                      | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 53                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Benzene                                | 71-43-2   | 5                                                                      | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Ethylbenzene                           | 100-41-4  | 700                                                                    | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | 3500                                                                   | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 20                                                                     | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Toluene                                | 108-88-3  | 1000                                                                   | ug/l          | 0.8           | J | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Xylenes (Total)                        | 1330-20-7 | 10000                                                                  | ug/l          | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND             | U | 0.5    | 1  |
| Semi Volatile Organic Compounds        |           |                                                                        |               |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |                |   |        |    |
| Chrysene                               | 218-01-9  | 1.9                                                                    | ug/l          | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | ND             | U | 10     | 1  |
| Fluorene                               | 86-73-7   | 1900                                                                   | ug/l          | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | ND             | U | 10     | 1  |
| Naphthalene                            | 91-20-3   | 100                                                                    | ug/l          | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | ND             | U | 10     | 1  |
| Phenanthrene                           | 85-01-8   | 1100                                                                   | ug/l          | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | ND             | U | 10     | 1  |
| Pyrene                                 | 129-00-0  | 130                                                                    | ug/l          | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  | ND            | U | 1      | 1  | ND             | U | 10     | 1  |
| Metals                                 |           |                                                                        |               |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |                |   |        |    |
| Lead (Dissolved)                       | 7439-92-1 | 5                                                                      | ug/l          | ND            | U | 0.052  | 1  | ND           | U | 0.052  | 1  | ND            | U | 0.052  | 1  | ND            | U | 0.052  | 1  | ND            | U | 0.052  | 1  | ND             | U | 0.052  | 1  |

**Notes:**  
DF - Dilution Factor  
PADEP - Pennsylvania Department of Environmental Protection  
ug/l - Micrograms per liter  
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater  
RL - Reporting limit (limit of quantitation)  
ND - Not detected

**Qualifiers:**  
Q - Qualifier  
U - Analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500  

10

 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 12  
Summary of Surface Water Analytical Results:  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PA Code<br>Chapter 93<br>Surface Water<br>Human Health<br>Criteria | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CCC | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CMC | Location ID   | SWS-1         |    |       |    | SWS-1                 |    |     |    | SWS-2         |    |       |    | SWS-2                 |    |     |    | SWS-3         |    |      |    |
|----------------------------------------|-----------|--------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|---------------|---------------|----|-------|----|-----------------------|----|-----|----|---------------|----|-------|----|-----------------------|----|-----|----|---------------|----|------|----|
|                                        |           |                                                                    |                                                          |                                                          | Sample ID     | SWS-1_040711  |    |       |    | SWS-1_040711 FILTERED |    |     |    | SWS-2_040711  |    |       |    | SWS-2_040711 FILTERED |    |     |    | SWS-3_040711  |    |      |    |
|                                        |           |                                                                    |                                                          |                                                          | Sample Date   | 4/7/2011      |    |       |    | 4/7/2011              |    |     |    | 4/7/2011      |    |       |    | 4/7/2011              |    |     |    | 4/7/2011      |    |      |    |
|                                        |           |                                                                    |                                                          |                                                          | Sample Matrix | Surface Water |    |       |    | Surface Water         |    |     |    | Surface Water |    |       |    | Surface Water         |    |     |    | Surface Water |    |      |    |
|                                        |           |                                                                    |                                                          |                                                          | Unit          | Result        | Q  | RL    | DF | Result                | Q  | RL  | DF | Result        | Q  | RL    | DF | Result                | Q  | RL  | DF | Result        | Q  | RL   | DF |
| Volatile Organic Compounds             |           |                                                                    |                                                          |                                                          |               |               |    |       |    |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 0.029 | 1  | --                    | -- | --  | -- | ND            | U  | 0.029 | 1  | --                    | -- | --  | -- | ND            | U  | 0.03 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 0.38                                                               | 3100                                                     | 15000                                                    | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  |
| Benzene                                | 71-43-2   | 1.2                                                                | 130                                                      | 640                                                      | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 70000                                                              | 210                                                      | 1100                                                     | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| Ethylbenzene                           | 100-41-4  | 530                                                                | 580                                                      | 2900                                                     | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| Toluene                                | 108-88-3  | 1300                                                               | 330                                                      | 1700                                                     | ug/l          | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  |
| Semi-Volatile Organic Compounds        |           |                                                                    |                                                          |                                                          |               |               |    |       |    |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |
| Chrysene                               | 218-01-9  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  |
| Fluorene                               | 86-73-7   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  |
| Naphthalene                            | 91-20-3   | NS                                                                 | 43                                                       | 140                                                      | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  |
| Phenanthrene                           | 85-01-8   | NS                                                                 | 1                                                        | 5                                                        | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  |
| Pyrene                                 | 129-00-0  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  |
| Metals                                 |           |                                                                    |                                                          |                                                          |               |               |    |       |    |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |
| Aluminum (Dissolved)                   | 7429-90-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | ND                    | U  | 200 | 1  | --            | -- | --    | -- | ND                    | U  | 200 | 1  | --            | -- | --   | -- |
| Aluminum                               | 7429-90-5 | NS                                                                 | NS                                                       | 750                                                      | ug/l          | ND            | U  | 200   | 1  | --                    | -- | --  | -- | ND            | U  | 200   | 1  | ND                    | U  | 200 | 1  | ND            | U  | 200  | 1  |
| Antimony (Dissolved)                   | 7440-36-0 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --   | -- |
| Antimony                               | 7440-36-0 | 5.6                                                                | 220                                                      | 1100                                                     | ug/l          | ND            | U  | 20    | 1  | --                    | -- | --  | -- | ND            | U  | 20    | 1  | ND                    | U  | 20  | 1  | ND            | U  | 20   | 1  |
| Arsenic (Dissolved)                    | 7440-38-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --   | -- |
| Arsenic                                | 7440-38-2 | 10                                                                 | 150                                                      | 340                                                      | ug/l          | ND            | U  | 20    | 1  | --                    | -- | --  | -- | ND            | U  | 20    | 1  | ND                    | U  | 20  | 1  | ND            | U  | 20   | 1  |
| Barium (Dissolved)                     | 7440-39-3 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | 40.8                  | 0  | 5   | 1  | --            | -- | --    | -- | 93.9                  | 0  | 5   | 1  | --            | -- | --   | -- |
| Barium                                 | 7440-39-3 | 2400                                                               | 4100                                                     | 21000                                                    | ug/l          | 85.3          | 0  | 5     | 1  | --                    | -- | --  | -- | 97.2          | 0  | 5     | 1  | 93.9                  | 0  | 5   | 1  | 91            | 0  | 5    | 1  |
| Beryllium (Dissolved)                  | 7440-41-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- |
| Beryllium                              | 7440-41-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | ND                    | U  | 5   | 1  | ND            | U  | 5    | 1  |
| Cadmium (Dissolved)                    | 7440-43-9 | NS                                                                 | 0.71                                                     | 8.80                                                     | ug/l          | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- |
| Cadmium                                | 7440-43-9 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | ND                    | U  | 5   | 1  | ND            | U  | 5    | 1  |
| Calcium (Dissolved)                    | 7440-70-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | 67000                 | 0  | 200 | 1  | --            | -- | --    | -- | 78000                 | 0  | 200 | 1  | --            | -- | --   | -- |
| Calcium                                | 7440-70-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 68300         | 0  | 200   | 1  | --                    | -- | --  | -- | 75700         | 0  | 200   | 1  | 78000                 | 0  | 200 | 1  | 94300         | 0  | 200  | 1  |
| Chromium, Total (Dissolved)            | 7440-47-3 | NS                                                                 | 10.00                                                    | 16.00                                                    | ug/l          | --            | -- | --    | -- | ND                    | U  | 15  | 1  | --            | -- | --    | -- | ND                    | U  | 15  | 1  | --            | -- | --   | -- |
| Chromium, Total                        | 7440-47-3 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 15    | 1  | --                    | -- | --  | -- | ND            | U  | 15    | 1  | ND                    | U  | 15  | 1  | ND            | U  | 15   | 1  |
| Cobalt (Dissolved)                     | 7440-48-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- |
| Cobalt                                 | 7440-48-4 | NS                                                                 | 19                                                       | 95                                                       | ug/l          | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5     | 1  | ND                    | U  | 5   | 1  | ND            | U  | 5    | 1  |
| Copper (Dissolved)                     | 7440-50-8 | NS                                                                 | 986.68                                                   | 1684.87                                                  | ug/l          | --            | -- | --    | -- | ND                    | U  | 10  | 1  | --            | -- | --    | -- | ND                    | U  | 10  | 1  | --            | -- | --   | -- |
| Copper                                 | 7440-50-8 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U  | 10    | 1  | --                    | -- | --  | -- | ND            | U  | 10    | 1  | ND                    | U  | 10  | 1  | ND            | U  | 10   | 1  |
| Iron (Dissolved)                       | 7439-89-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --            | -- | --    | -- | 268                   | 0  | 200 | 1  | --            | -- | --    | -- | 540                   | 0  | 200 | 1  | --            | -- | --   | -- |
| Iron                                   | 7439-89-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 740           | 0  | 200   | 1  | --                    | -- | --  | -- | 1850          | 0  | 200   | 1  | 540                   | 0  | 200 | 1  | 693           | 0  | 200  | 1  |



Table 12  
Summary of Surface Water Analytical Results:  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name               | CAS No    | PA Code<br>Chapter 93<br>Surface Water<br>Human Health<br>Criteria | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CCC | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CMC | Location ID   | SWS-1         |   |            |    | SWS-1                 |   |           |    | SWS-2         |   |            |    | SWS-2                 |   |      |    | SWS-3         |   |            |    |
|-----------------------------|-----------|--------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|---------------|---------------|---|------------|----|-----------------------|---|-----------|----|---------------|---|------------|----|-----------------------|---|------|----|---------------|---|------------|----|
|                             |           |                                                                    |                                                          |                                                          | Sample ID     | SWS-1_040711  |   |            |    | SWS-1_040711 FILTERED |   |           |    | SWS-2_040711  |   |            |    | SWS-2_040711 FILTERED |   |      |    | SWS-3_040711  |   |            |    |
|                             |           |                                                                    |                                                          |                                                          | Sample Date   | 4/7/2011      |   |            |    | 4/7/2011              |   |           |    | 4/7/2011      |   |            |    | 4/7/2011              |   |      |    | 4/7/2011      |   |            |    |
|                             |           |                                                                    |                                                          |                                                          | Sample Matrix | Surface Water |   |            |    | Surface Water         |   |           |    | Surface Water |   |            |    | Surface Water         |   |      |    | Surface Water |   |            |    |
|                             |           |                                                                    |                                                          |                                                          | Unit          | Result        | Q | RL         | DF | Result                | Q | RL        | DF | Result        | Q | RL         | DF | Result                | Q | RL   | DF | Result        | Q | RL         | DF |
| Lead (Dissolved)            | 7439-92-1 | NS                                                                 | 3.47                                                     | 215.91                                                   | ug/l          | –             | – | –          | –  | ND                    | U | <b>15</b> | 1  | –             | – | –          | –  | ND                    | U | 15   | 1  | –             | – | –          | –  |
| Lead                        | 7439-92-1 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 19.3          | 0 | 15         | 1  | –                     | – | –         | –  | ND            | U | 15         | 1  | ND                    | U | 15   | 1  | ND            | U | 15         | 1  |
| Magnesium (Dissolved)       | 7439-95-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | 27500                 | 0 | 100       | 1  | –             | – | –          | –  | 33600                 | 0 | 100  | 1  | –             | – | –          | –  |
| Magnesium                   | 7439-95-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 28000         | 0 | 100        | 1  | –                     | – | –         | –  | 32100         | 0 | 100        | 1  | 33600                 | 0 | 100  | 1  | 57600         | 0 | 100        | 1  |
| Manganese (Dissolved)       | 7439-96-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | 67.3                  | 0 | 5         | 1  | –             | – | –          | –  | 260                   | 0 | 5    | 1  | –             | – | –          | –  |
| Manganese                   | 7439-96-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 100           | 0 | 5          | 1  | –                     | – | –         | –  | 310           | 0 | 5          | 1  | 260                   | 0 | 5    | 1  | 167           | 0 | 5          | 1  |
| Mercury (Dissolved)         | 7439-97-6 | NS                                                                 | 0.77                                                     | 1.4                                                      | ug/l          | –             | – | –          | –  | ND                    | U | 0.2       | 1  | –             | – | –          | –  | ND                    | U | 0.2  | 1  | –             | – | –          | –  |
| Mercury                     | 7439-97-6 | 0.05                                                               | NS                                                       | NS                                                       | ug/l          | ND            | U | <b>0.2</b> | 1  | –                     | – | –         | –  | ND            | U | <b>0.2</b> | 1  | ND                    | U | 0.2  | 1  | ND            | U | <b>0.2</b> | 1  |
| Nickel (Dissolved)          | 7440-02-0 | NS                                                                 | 188.01                                                   | 1692.75                                                  | ug/l          | –             | – | –          | –  | ND                    | U | 10        | 1  | –             | – | –          | –  | 18.1                  | 0 | 10   | 1  | –             | – | –          | –  |
| Nickel                      | 7440-02-0 | 610                                                                | NS                                                       | NS                                                       | ug/l          | ND            | U | 10         | 1  | –                     | – | –         | –  | 18.2          | 0 | 10         | 1  | 18.1                  | 0 | 10   | 1  | ND            | U | 10         | 1  |
| Potassium (Dissolved)       | 7440-09-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | 5390                  | 0 | 500       | 1  | –             | – | –          | –  | 5670                  | 0 | 500  | 1  | –             | – | –          | –  |
| Potassium                   | 7440-09-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 5430          | 0 | 500        | 1  | –                     | – | –         | –  | 5630          | 0 | 500        | 1  | 5670                  | 0 | 500  | 1  | 7250          | 0 | 500        | 1  |
| Selenium (Dissolved)        | 7782-49-2 | NS                                                                 | 4.6                                                      | NS                                                       | ug/l          | –             | – | –          | –  | ND                    | U | <b>20</b> | 1  | –             | – | –          | –  | ND                    | U | 20   | 1  | –             | – | –          | –  |
| Selenium                    | 7782-49-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U | 20         | 1  | –                     | – | –         | –  | ND            | U | 20         | 1  | ND                    | U | 20   | 1  | ND            | U | 20         | 1  |
| Silver (Dissolved)          | 7440-22-4 | NS                                                                 | NS                                                       | 23235308.62                                              | ug/l          | –             | – | –          | –  | ND                    | U | 5         | 1  | –             | – | –          | –  | ND                    | U | 5    | 1  | –             | – | –          | –  |
| Silver                      | 7440-22-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND            | U | 5          | 1  | –                     | – | –         | –  | ND            | U | 5          | 1  | ND                    | U | 5    | 1  | ND            | U | 5          | 1  |
| Sodium (Dissolved)          | 7440-23-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | 18800                 | 0 | 1000      | 1  | –             | – | –          | –  | 19100                 | 0 | 1000 | 1  | –             | – | –          | –  |
| Sodium                      | 7440-23-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 18700         | 0 | 1000       | 1  | –                     | – | –         | –  | 18700         | 0 | 1000       | 1  | 19100                 | 0 | 1000 | 1  | 22800         | 0 | 1000       | 1  |
| Thallium (Dissolved)        | 7440-28-0 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | ND                    | U | 30        | 1  | –             | – | –          | –  | ND                    | U | 30   | 1  | –             | – | –          | –  |
| Thallium                    | 7440-28-0 | 0.24                                                               | 13                                                       | 65                                                       | ug/l          | ND            | U | <b>30</b>  | 1  | –                     | – | –         | –  | ND            | U | <b>30</b>  | 1  | ND                    | U | 30   | 1  | ND            | U | <b>30</b>  | 1  |
| Vanadium (Dissolved)        | 7440-62-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | –             | – | –          | –  | ND                    | U | 5         | 1  | –             | – | –          | –  | ND                    | U | 5    | 1  | –             | – | –          | –  |
| Vanadium                    | 7440-62-2 | NS                                                                 | 100                                                      | 510                                                      | ug/l          | ND            | U | 5          | 1  | –                     | – | –         | –  | ND            | U | 5          | 1  | ND                    | U | 5    | 1  | ND            | U | 5          | 1  |
| Zinc (Dissolved)            | 7440-66-6 | NS                                                                 | 427.94                                                   | 424.46                                                   | ug/l          | –             | – | –          | –  | ND                    | U | 20        | 1  | –             | – | –          | –  | 109                   | 0 | 20   | 1  | –             | – | –          | –  |
| Zinc                        | 7440-66-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 29.5          | 0 | 20         | 1  | –                     | – | –         | –  | 138           | 0 | 20         | 1  | 109                   | 0 | 20   | 1  | 42.5          | 0 | 20         | 1  |
| General Chemistry           |           |                                                                    |                                                          |                                                          |               |               |   |            |    |                       |   |           |    |               |   |            |    |                       |   |      |    |               |   |            |    |
| Lime (As Calcium Carbonate) | 471-34-1  | NS                                                                 | NS                                                       | NS                                                       | mg/l          | 270           |   | 6          | 2  | –                     | – | –         | –  | 327           |   | 15         | 5  | –                     | – | –    | –  | 487           |   | 15         | 5  |

**Notes:**  
DF - Dilution Factor  
ug/l - micrograms per kilogram  
mg/l - milligrams per kilogram  
CCC - Criteria Continous Concentration PA Title 25, Chapter 93.8  
CMC - Criteria Maximum Concentration PA Title 25, Chapter 93.8  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
– - No Data Available

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate)

**Exceedance Summary:**  

**10** - RL exceeds at least on the Surface Water Criteria

**10** - Concentration exceeds the PA Code Chapter 93 Surface Water Human Health Criteria

**10** - Concentration exceeds the PA Code Chapter 93 Fish and Aquatic Life CCC

**10** - Concentration exceeds the PA Code Chapter 93 Fish and Aquatic Life CMC

Table 12  
Summary of Surface Water Analytical Results:  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | PA Code<br>Chapter 93<br>Surface Water<br>Human Health<br>Criteria | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CCC | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CMC | Location ID   | SWS-3                 |    |     |    | SWS-4         |    |       |    | SWS-4                 |    |     |    | SWS-5         |    |      |    | SWS-5                 |    |     |    |  |  |
|----------------------------------------|-----------|--------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|---------------|-----------------------|----|-----|----|---------------|----|-------|----|-----------------------|----|-----|----|---------------|----|------|----|-----------------------|----|-----|----|--|--|
|                                        |           |                                                                    |                                                          |                                                          | Sample ID     | SWS-3_040711 FILTERED |    |     |    | SWS-4_040711  |    |       |    | SWS-4_040711 FILTERED |    |     |    | SWS-5_040711  |    |      |    | SWS-5_040711 FILTERED |    |     |    |  |  |
|                                        |           |                                                                    |                                                          |                                                          | Sample Date   | 4/7/2011              |    |     |    | 4/7/2011      |    |       |    | 4/7/2011              |    |     |    | 4/7/2011      |    |      |    | 4/7/2011              |    |     |    |  |  |
|                                        |           |                                                                    |                                                          |                                                          | Sample Matrix | Surface Water         |    |     |    | Surface Water |    |       |    | Surface Water         |    |     |    | Surface Water |    |      |    | Surface Water         |    |     |    |  |  |
|                                        |           |                                                                    |                                                          |                                                          | Unit          | Result                | Q  | RL  | DF | Result        | Q  | RL    | DF | Result                | Q  | RL  | DF | Result        | Q  | RL   | DF | Result                | Q  | RL  | DF |  |  |
| Volatile Organic Compounds             |           |                                                                    |                                                          |                                                          |               |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |                       |    |     |    |  |  |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  | --                    | -- | --  | -- |  |  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 0.029 | 1  | --                    | -- | --  | -- | ND            | U  | 0.03 | 1  | --                    | -- | --  | -- |  |  |
| 1,2-Dichloroethane                     | 107-06-2  | 0.38                                                               | 3100                                                     | 15000                                                    | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  | --                    | -- | --  | -- |  |  |
| Benzene                                | 71-43-2   | 1.2                                                                | 130                                                      | 640                                                      | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 70000                                                              | 210                                                      | 1100                                                     | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| Ethylbenzene                           | 100-41-4  | 530                                                                | 580                                                      | 2900                                                     | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 2     | 1  | --                    | -- | --  | -- | ND            | U  | 2    | 1  | --                    | -- | --  | -- |  |  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| Toluene                                | 108-88-3  | 1300                                                               | 330                                                      | 1700                                                     | ug/l          | --                    | -- | --  | -- | ND            | U  | 1     | 1  | --                    | -- | --  | -- | ND            | U  | 1    | 1  | --                    | -- | --  | -- |  |  |
| Semi-Volatile Organic Compounds        |           |                                                                    |                                                          |                                                          |               |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |                       |    |     |    |  |  |
| Chrysene                               | 218-01-9  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Fluorene                               | 86-73-7   | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Naphthalene                            | 91-20-3   | NS                                                                 | 43                                                       | 140                                                      | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Phenanthrene                           | 85-01-8   | NS                                                                 | 1                                                        | 5                                                        | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Pyrene                                 | 129-00-0  | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Metals                                 |           |                                                                    |                                                          |                                                          |               |                       |    |     |    |               |    |       |    |                       |    |     |    |               |    |      |    |                       |    |     |    |  |  |
| Aluminum (Dissolved)                   | 7429-90-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 200 | 1  | --            | -- | --    | -- | ND                    | U  | 200 | 1  | --            | -- | --   | -- | ND                    | U  | 200 | 1  |  |  |
| Aluminum                               | 7429-90-5 | NS                                                                 | NS                                                       | 750                                                      | ug/l          | --                    | -- | --  | -- | ND            | U  | 200   | 1  | --                    | -- | --  | -- | 217           | 0  | 200  | 1  | --                    | -- | --  | -- |  |  |
| Antimony (Dissolved)                   | 7440-36-0 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 20  | 1  | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --   | -- | ND                    | U  | 20  | 1  |  |  |
| Antimony                               | 7440-36-0 | 5.6                                                                | 220                                                      | 1100                                                     | ug/l          | --                    | -- | --  | -- | ND            | U  | 20    | 1  | --                    | -- | --  | -- | ND            | U  | 20   | 1  | --                    | -- | --  | -- |  |  |
| Arsenic (Dissolved)                    | 7440-38-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 20  | 1  | --            | -- | --    | -- | ND                    | U  | 20  | 1  | --            | -- | --   | -- | ND                    | U  | 20  | 1  |  |  |
| Arsenic                                | 7440-38-2 | 10                                                                 | 150                                                      | 340                                                      | ug/l          | --                    | -- | --  | -- | ND            | U  | 20    | 1  | --                    | -- | --  | -- | ND            | U  | 20   | 1  | --                    | -- | --  | -- |  |  |
| Barium (Dissolved)                     | 7440-39-3 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 82.3                  | 0  | 5   | 1  | --            | -- | --    | -- | 124                   | 0  | 5   | 1  | --            | -- | --   | -- | 111                   | 0  | 5   | 1  |  |  |
| Barium                                 | 7440-39-3 | 2400                                                               | 4100                                                     | 21000                                                    | ug/l          | --                    | -- | --  | -- | 138           | 0  | 5     | 1  | --                    | -- | --  | -- | 124           | 0  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Beryllium (Dissolved)                  | 7440-41-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- | ND                    | U  | 5   | 1  |  |  |
| Beryllium                              | 7440-41-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Cadmium (Dissolved)                    | 7440-43-9 | NS                                                                 | 0.71                                                     | 8.80                                                     | ug/l          | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- | ND                    | U  | 5   | 1  |  |  |
| Cadmium                                | 7440-43-9 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Calcium (Dissolved)                    | 7440-70-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 91600                 | 0  | 200 | 1  | --            | -- | --    | -- | 119000                | 0  | 200 | 1  | --            | -- | --   | -- | 109000                | 0  | 200 | 1  |  |  |
| Calcium                                | 7440-70-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | 119000        | 0  | 200   | 1  | --                    | -- | --  | -- | 110000        | 0  | 200  | 1  | --                    | -- | --  | -- |  |  |
| Chromium, Total (Dissolved)            | 7440-47-3 | NS                                                                 | 10.00                                                    | 16.00                                                    | ug/l          | ND                    | U  | 15  | 1  | --            | -- | --    | -- | ND                    | U  | 15  | 1  | --            | -- | --   | -- | ND                    | U  | 15  | 1  |  |  |
| Chromium, Total                        | 7440-47-3 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 15    | 1  | --                    | -- | --  | -- | ND            | U  | 15   | 1  | --                    | -- | --  | -- |  |  |
| Cobalt (Dissolved)                     | 7440-48-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 5   | 1  | --            | -- | --    | -- | ND                    | U  | 5   | 1  | --            | -- | --   | -- | ND                    | U  | 5   | 1  |  |  |
| Cobalt                                 | 7440-48-4 | NS                                                                 | 19                                                       | 95                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 5     | 1  | --                    | -- | --  | -- | ND            | U  | 5    | 1  | --                    | -- | --  | -- |  |  |
| Copper (Dissolved)                     | 7440-50-8 | NS                                                                 | 986.68                                                   | 1684.87                                                  | ug/l          | ND                    | U  | 10  | 1  | --            | -- | --    | -- | ND                    | U  | 10  | 1  | --            | -- | --   | -- | ND                    | U  | 10  | 1  |  |  |
| Copper                                 | 7440-50-8 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | ND            | U  | 10    | 1  | --                    | -- | --  | -- | ND            | U  | 10   | 1  | --                    | -- | --  | -- |  |  |
| Iron (Dissolved)                       | 7439-89-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 200 | 1  | --            | -- | --    | -- | ND                    | U  | 200 | 1  | --            | -- | --   | -- | ND                    | U  | 200 | 1  |  |  |
| Iron                                   | 7439-89-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --  | -- | 1600          | 0  | 200   | 1  | --                    | -- | --  | -- | 1470          | 0  | 200  | 1  | --                    | -- | --  | -- |  |  |



Table 12  
Summary of Surface Water Analytical Results:  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name               | CAS No    | PA Code<br>Chapter 93<br>Surface Water<br>Human Health<br>Criteria | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CCC | PA Code<br>Chapter 93<br>Fish and<br>Aquatic Life<br>CMC | Location ID   | SWS-3                 |    |      |    | SWS-4         |    |      |    | SWS-4                 |    |      |    | SWS-5         |    |      |    | SWS-5                 |    |      |    |
|-----------------------------|-----------|--------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|---------------|-----------------------|----|------|----|---------------|----|------|----|-----------------------|----|------|----|---------------|----|------|----|-----------------------|----|------|----|
|                             |           |                                                                    |                                                          |                                                          | Sample ID     | SWS-3_040711 FILTERED |    |      |    | SWS-4_040711  |    |      |    | SWS-4_040711 FILTERED |    |      |    | SWS-5_040711  |    |      |    | SWS-5_040711 FILTERED |    |      |    |
|                             |           |                                                                    |                                                          |                                                          | Sample Date   | 4/7/2011              |    |      |    | 4/7/2011      |    |      |    | 4/7/2011              |    |      |    | 4/7/2011      |    |      |    | 4/7/2011              |    |      |    |
|                             |           |                                                                    |                                                          |                                                          | Sample Matrix | Surface Water         |    |      |    | Surface Water |    |      |    | Surface Water         |    |      |    | Surface Water |    |      |    | Surface Water         |    |      |    |
|                             |           |                                                                    |                                                          |                                                          | Unit          | Result                | Q  | RL   | DF | Result        | Q  | RL   | DF | Result                | Q  | RL   | DF | Result        | Q  | RL   | DF | Result                | Q  | RL   | DF |
| Lead (Dissolved)            | 7439-92-1 | NS                                                                 | 3.47                                                     | 215.91                                                   | ug/l          | ND                    | U  | 15   | 1  | --            | -- | --   | -- | ND                    | U  | 15   | 1  | --            | -- | --   | -- | ND                    | U  | 15   | 1  |
| Lead                        | 7439-92-1 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 15   | 1  | --                    | -- | --   | -- | ND            | U  | 15   | 1  | --                    | -- | --   | -- |
| Magnesium (Dissolved)       | 7439-95-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 56400                 | 0  | 100  | 1  | --            | -- | --   | -- | 74700                 | 0  | 100  | 1  | --            | -- | --   | -- | 70400                 | 0  | 100  | 1  |
| Magnesium                   | 7439-95-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | 74700         | 0  | 100  | 1  | --                    | -- | --   | -- | 69600         | 0  | 100  | 1  | --                    | -- | --   | -- |
| Manganese (Dissolved)       | 7439-96-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 8.1                   | 0  | 5    | 1  | --            | -- | --   | -- | 197                   | 0  | 5    | 1  | --            | -- | --   | -- | 94.3                  | 0  | 5    | 1  |
| Manganese                   | 7439-96-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | 426           | 0  | 5    | 1  | --                    | -- | --   | -- | 304           | 0  | 5    | 1  | --                    | -- | --   | -- |
| Mercury (Dissolved)         | 7439-97-6 | NS                                                                 | 0.77                                                     | 1.4                                                      | ug/l          | ND                    | U  | 0.2  | 1  | --            | -- | --   | -- | ND                    | U  | 0.2  | 1  | --            | -- | --   | -- | ND                    | U  | 0.2  | 1  |
| Mercury                     | 7439-97-6 | 0.05                                                               | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 0.2  | 1  | --                    | -- | --   | -- | ND            | U  | 0.2  | 1  | --                    | -- | --   | -- |
| Nickel (Dissolved)          | 7440-02-0 | NS                                                                 | 188.01                                                   | 1692.75                                                  | ug/l          | ND                    | U  | 10   | 1  | --            | -- | --   | -- | ND                    | U  | 10   | 1  | --            | -- | --   | -- | ND                    | U  | 10   | 1  |
| Nickel                      | 7440-02-0 | 610                                                                | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 10   | 1  | --                    | -- | --   | -- | ND            | U  | 10   | 1  | --                    | -- | --   | -- |
| Potassium (Dissolved)       | 7440-09-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 7100                  | 0  | 500  | 1  | --            | -- | --   | -- | 11000                 | 0  | 500  | 1  | --            | -- | --   | -- | 10300                 | 0  | 500  | 1  |
| Potassium                   | 7440-09-7 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | 11100         | 0  | 500  | 1  | --                    | -- | --   | -- | 10400         | 0  | 500  | 1  | --                    | -- | --   | -- |
| Selenium (Dissolved)        | 7782-49-2 | NS                                                                 | 4.6                                                      | NS                                                       | ug/l          | ND                    | U  | 20   | 1  | --            | -- | --   | -- | ND                    | U  | 20   | 1  | --            | -- | --   | -- | ND                    | U  | 20   | 1  |
| Selenium                    | 7782-49-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 20   | 1  | --                    | -- | --   | -- | ND            | U  | 20   | 1  | --                    | -- | --   | -- |
| Silver (Dissolved)          | 7440-22-4 | NS                                                                 | NS                                                       | 23235308.62                                              | ug/l          | ND                    | U  | 5    | 1  | --            | -- | --   | -- | ND                    | U  | 5    | 1  | --            | -- | --   | -- | ND                    | U  | 5    | 1  |
| Silver                      | 7440-22-4 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 5    | 1  | --                    | -- | --   | -- | ND            | U  | 5    | 1  | --                    | -- | --   | -- |
| Sodium (Dissolved)          | 7440-23-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | 21600                 | 0  | 1000 | 1  | --            | -- | --   | -- | 18500                 | 0  | 1000 | 1  | --            | -- | --   | -- | 17300                 | 0  | 1000 | 1  |
| Sodium                      | 7440-23-5 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | 17800         | 0  | 1000 | 1  | --                    | -- | --   | -- | 17100         | -- | 1000 | 1  | --                    | -- | --   | -- |
| Thallium (Dissolved)        | 7440-28-0 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 30   | 1  | --            | -- | --   | -- | ND                    | U  | 30   | 1  | --            | -- | --   | -- | ND                    | U  | 30   | 1  |
| Thallium                    | 7440-28-0 | 0.24                                                               | 13                                                       | 65                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 30   | 1  | --                    | -- | --   | -- | ND            | U  | 30   | 1  | --                    | -- | --   | -- |
| Vanadium (Dissolved)        | 7440-62-2 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | ND                    | U  | 5    | 1  | --            | -- | --   | -- | ND                    | U  | 5    | 1  | --            | -- | --   | -- | ND                    | U  | 5    | 1  |
| Vanadium                    | 7440-62-2 | NS                                                                 | 100                                                      | 510                                                      | ug/l          | --                    | -- | --   | -- | ND            | U  | 5    | 1  | --                    | -- | --   | -- | ND            | U  | 5    | 1  | --                    | -- | --   | -- |
| Zinc (Dissolved)            | 7440-66-6 | NS                                                                 | 427.94                                                   | 424.46                                                   | ug/l          | 21.8                  | 0  | 20   | 1  | --            | -- | --   | -- | ND                    | U  | 20   | 1  | --            | -- | --   | -- | ND                    | U  | 20   | 1  |
| Zinc                        | 7440-66-6 | NS                                                                 | NS                                                       | NS                                                       | ug/l          | --                    | -- | --   | -- | ND            | U  | 20   | 1  | --                    | -- | --   | -- | ND            | U  | 20   | 1  | --                    | -- | --   | -- |
| General Chemistry           |           |                                                                    |                                                          |                                                          |               |                       |    |      |    |               |    |      |    |                       |    |      |    |               |    |      |    |                       |    |      |    |
| Lime (As Calcium Carbonate) | 471-34-1  | NS                                                                 | NS                                                       | NS                                                       | mg/l          | --                    | -- | --   | -- | 614           |    | 15   | 5  | --                    | -- | --   | -- | 586           |    | 15   | 5  | --                    |    | --   | -- |

Notes:

DF - Dilution Factor  
ug/l - micrograms per kilogram  
mg/l - milligrams per kilogram  
CCC - Criteria Continous Concentration PA Title 25, Chapter 93.8  
CMC - Criteria Maximum Concentration PA Title 25, Chapter 93.8  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard  
-- - No Data Available

Qualifiers:

Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate)

Exceedance Summary:

- 10 - RL exceeds at least on the Surface Water Criteria
- 10 - Concentration exceeds the PA Code Chapter 93 Surface Water Human Health Criteria
- 10 - Concentration exceeds the PA Code Chapter 93 Fish and Aquatic Life CCC
- 10 - Concentration exceeds the PA Code Chapter 93 Fish and Aquatic Life CMC

Table 13  
Summary of Sediment Analytical Results  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, PA

| Chemical Name                          | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | PADEP's<br>Residential Soil<br>MSC: 0-15 ft bgs | Location ID   | SED-1        |   |       |      |
|----------------------------------------|-----------|--------------------------------------------------------------------|---|--------------------------------------------------------------------|---|-------------------------------------------------|---------------|--------------|---|-------|------|
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample ID     | SED-1_040711 |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample Date   | 4/7/2011     |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample Matrix | Sediment     |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Unit          | Result       | Q | RL    | DF   |
| Volatile Organic Compounds             |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | NS                                                                 |   | NS                                                                 |   | 130.00                                          | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | NS                                                                 |   | NS                                                                 |   | 0.01                                            | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,2-Dichlorobenzene                    | 95-50-1   | NS                                                                 |   | 0.29                                                               | e | 60.00                                           | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,2-Dichloroethane                     | 107-06-2  | NS                                                                 |   | 0.26                                                               | e | 0.50                                            | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | NS                                                                 |   | NS                                                                 |   | 110.00                                          | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,3-Dichlorobenzene                    | 541-73-1  | NS                                                                 |   | 1.32                                                               | e | 60.00                                           | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1,4-Dichlorobenzene                    | 106-46-7  | NS                                                                 |   | 0.32                                                               | e | 7.50                                            | mg/kg         | ND           | U | 0.01  | 1.06 |
| 1-Methylnaphthalene                    | 90-12-0   | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 6            |   | 0.31  | 100  |
| Benzene                                | 71-43-2   | NS                                                                 |   | 0.14                                                               | e | 0.50                                            | mg/kg         | 0.01         |   | 0.01  | 1.06 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | NS                                                                 |   | 0.43                                                               | e | 1000.00                                         | mg/kg         | ND           | U | 0.01  | 1.06 |
| Ethylbenzene                           | 100-41-4  | NS                                                                 |   | 0.18                                                               | e | 70.00                                           | mg/kg         | ND           | U | 0.01  | 1.06 |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                 |   | NS                                                                 |   | 84.00                                           | mg/kg         | ND           | U | 0.01  | 1.06 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | NS                                                                 |   | NS                                                                 |   | 2.00                                            | mg/kg         | ND           | U | 0.01  | 1.06 |
| Toluene                                | 108-88-3  | NS                                                                 |   | 1.22                                                               | e | 100.00                                          | mg/kg         | ND           | U | 0.01  | 1.06 |
| Semi-Volatile Organic Compounds        |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 2,4-Dimethylphenol                     | 105-67-9  | NS                                                                 |   | 0.30                                                               | e | 73.00                                           | mg/kg         | ND           | U | 3.1   | 10   |
| 2,4-Dinitrophenol                      | 51-28-5   | NS                                                                 |   | 0.01                                                               | e | 7.30                                            | mg/kg         | ND           | U | 18    | 10   |
| 2-Methylphenol (O-Cresol)              | 95-48-7   | NS                                                                 |   | 0.06                                                               | e | 180.00                                          | mg/kg         | ND           | U | 3.1   | 10   |
| 2-Nitrophenol                          | 88-75-5   | NS                                                                 |   | NS                                                                 |   | 29.00                                           | mg/kg         | ND           | U | 3.1   | 10   |
| 6-Methylchrysene                       | 1705-85-7 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 3.1   | 10   |
| Anthracene                             | 120-12-7  | 0.37                                                               | a | 0.22                                                               | c | 35.00                                           | mg/kg         | 0.66         |   | 0.031 | 10   |
| Benzenethiol                           | 108-98-5  | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 18    | 10   |
| Benzo(A)Anthracene                     | 56-55-3   | 1.48                                                               | a | 0.32                                                               | c | 2.50                                            | mg/kg         | 0.52         |   | 0.031 | 10   |
| Benzo(A)Pyrene                         | 50-32-8   | 1.44                                                               | a | 0.37                                                               | c | 0.57                                            | mg/kg         | 0.54         |   | 0.031 | 10   |
| Benzo(B)Fluoranthene                   | 205-99-2  | NS                                                                 |   | 10.40                                                              | e | 4.00                                            | mg/kg         | 0.55         |   | 0.031 | 10   |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.32                                                               | a | 0.17                                                               | c | 18.00                                           | mg/kg         | 0.64         |   | 0.031 | 10   |
| Benzo(K)Fluoranthene                   | 207-08-9  | 1.34                                                               | a | 0.24                                                               | c | 57.00                                           | mg/kg         | ND           | U | 3.1   | 10   |
| Benzyl Butyl Phthalate                 | 85-68-7   | NS                                                                 |   | 1.97                                                               | e | 300.00                                          | mg/kg         | ND           | U | 3.1   | 10   |
| Bis(2-Ethylhexyl) Phthalate            | 117-81-7  | NS                                                                 |   | 0.18                                                               | e | 13.00                                           | mg/kg         | ND           | U | 6.2   | 10   |
| Chrysene                               | 218-01-9  | 0.46                                                               | a | 0.34                                                               | c | 23.00                                           | mg/kg         | 0.89         |   | 0.031 | 10   |
| Dibenz(A,H)Acridine                    | 226-36-8  | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 3.1   | 10   |
| Dibenz(A,H)Anthracene                  | 53-70-3   | 0.13                                                               | a | 0.06                                                               | c | 0.57                                            | mg/kg         | ND           | U | 3.1   | 10   |
| Diethyl Phthalate                      | 84-66-2   | NS                                                                 |   | NS                                                                 |   | 2900.00                                         | mg/kg         | ND           | U | 3.1   | 10   |
| Dimethyl Phthalate                     | 131-11-3  | NS                                                                 |   | 0.32                                                               | e | NS                                              | mg/kg         | ND           | U | 3.1   | 10   |
| Di-N-Butyl Phthalate                   | 84-74-2   | NS                                                                 |   | NS                                                                 |   | 370.00                                          | mg/kg         | ND           | U | 3.1   | 10   |
| Di-N-Octylphthalate                    | 117-84-0  | NS                                                                 |   | NS                                                                 |   | 1000.00                                         | mg/kg         | ND           | U | 3.1   | 10   |
| Fluoranthene                           | 206-44-0  | 1.02                                                               | a | 0.75                                                               | c | 320.00                                          | mg/kg         | ND           | U | 3.1   | 10   |
| Fluorene                               | 86-73-7   | 4.792                                                              | a | 0.19                                                               | c | 300.00                                          | mg/kg         | 0.36         |   | 0.031 | 10   |
| Naphthalene                            | 91-20-3   | NS                                                                 |   | 0.16                                                               | d | 10.00                                           | mg/kg         | 7.7          |   | 0.31  | 100  |
| Phenanthrene                           | 85-01-8   | 0.16                                                               | a | 0.56                                                               | c | 1000.00                                         | mg/kg         | 2.3          |   | 0.031 | 10   |
| Phenol                                 | 108-95-2  | NS                                                                 |   | 0.05                                                               | e | 200.00                                          | mg/kg         | ND           | U | 3.1   | 10   |
| Pyrene                                 | 129-00-0  | 0.85                                                               | a | 0.49                                                               | c | 220.00                                          | mg/kg         | 1.2          |   | 0.031 | 10   |
| Metals                                 |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| Aluminum                               | 7429-90-5 | NS                                                                 |   | NS                                                                 |   | 190000.00                                       | mg/kg         | 15400        |   | 36.4  | 1    |
| Antimony                               | 7440-36-0 | NS                                                                 |   | 2.00                                                               | d | 2.70                                            | mg/kg         | ND           | U | 3.64  | 1    |
| Arsenic                                | 7440-38-2 | 33                                                                 | b | 6.00                                                               | c | 2.90                                            | mg/kg         | 24           |   | 3.64  | 1    |
| Barium                                 | 7440-39-3 | NS                                                                 |   | NS                                                                 |   | 820.00                                          | mg/kg         | 331          |   | 0.909 | 1    |
| Beryllium                              | 7440-41-7 | NS                                                                 |   | NS                                                                 |   | 32.00                                           | mg/kg         | 1.12         |   | 0.909 | 1    |
| Cadmium                                | 7440-43-9 | 10                                                                 | b | 0.60                                                               | c | 3.80                                            | mg/kg         | 2.22         |   | 0.909 | 1    |
| Calcium                                | 7440-70-2 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 4150         |   | 36.4  | 1    |
| Chromium, Total                        | 7440-47-3 | 110                                                                | b | 26.00                                                              | c | NS                                              | mg/kg         | 89.7         |   | 2.73  | 1    |
| Cobalt                                 | 7440-48-4 | NS                                                                 |   | 50.00                                                              | e | 5.00                                            | mg/kg         | 15           |   | 0.909 | 1    |
| Copper                                 | 7440-50-8 | 110                                                                | b | 16.00                                                              | c | 4300.00                                         | mg/kg         | 573          |   | 1.82  | 1    |
| Iron                                   | 7439-89-6 | 40000                                                              | b | 20000.00                                                           | c | 150000.00                                       | mg/kg         | 44500        |   | 36.4  | 1    |
| Lead                                   | 7439-92-1 | 250                                                                | b | 31.00                                                              | c | 45.00                                           | mg/kg         | 3610         |   | 13.6  | 5    |
| Magnesium                              | 7439-95-4 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 3370         |   | 18.2  | 1    |
| Manganese                              | 7439-96-5 | 1100                                                               | b | 460.00                                                             | c | 200.00                                          | mg/kg         | 461          |   | 0.909 | 1    |
| Mercury                                | 7439-97-6 | 2                                                                  | b | 0.20                                                               | c | 1.00                                            | mg/kg         | 3.59         |   | 0.882 | 5    |
| Nickel                                 | 7440-02-0 | 75                                                                 | b | 16.00                                                              | c | 65.00                                           | mg/kg         | 45.6         |   | 1.82  | 1    |
| Potassium                              | 7440-09-7 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 1780         |   | 90.9  | 1    |
| Selenium                               | 7782-49-2 | NS                                                                 |   | NS                                                                 |   | 5.00                                            | mg/kg         | 5.3          |   | 3.64  | 1    |
| Silver                                 | 7440-22-4 | NS                                                                 |   | 1.00                                                               | d | 10.00                                           | mg/kg         | 2.96         |   | 0.909 | 1    |
| Sodium                                 | 7440-23-5 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 264          |   | 182   | 1    |
| Thallium                               | 7440-28-0 | NS                                                                 |   | NS                                                                 |   | 1.40                                            | mg/kg         | ND           | U | 5.46  | 1    |
| Vanadium                               | 7440-62-2 | NS                                                                 |   | NS                                                                 |   | 1500.00                                         | mg/kg         | 68           |   | 0.909 | 1    |
| Zinc                                   | 7440-66-6 | 820                                                                | b | 120.00                                                             | c | 1200.00                                         | mg/kg         | 503          |   | 3.64  | 1    |
| General Chemistry                      |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| Moisture, Percent                      | MOIST     | NS                                                                 |   | NS                                                                 |   | NS                                              | %             | 46.1         |   | 0.5   | 1    |
| Total Organic Carbon                   | TOC       | 100000                                                             | b | 10000                                                              | c | NS                                              | mg/kg         | 302000       |   | 18300 | 1    |
| Grain Size Analysis                    |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 0.001 Mm                               | GS.001MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 1            |   | 1     | 1    |
| 0.002 Mm                               | GS.002MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 2            |   | 1     | 1    |
| 0.005 Mm                               | GS.005MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 6            |   | 1     | 1    |
| 0.02 Mm                                | GS.02MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 13           |   | 1     | 1    |
| 0.05 Mm                                | GS.05MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 22           |   | 1     | 1    |
| 0.064 Mm                               | GS.064MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 28           |   | 1     | 1    |
| 0.075 Mm                               | GS.075MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 30.7         |   | 1     | 1    |
| 0.15 Mm                                | GS.15MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 37.3         |   | 1     | 1    |
| 0.3 Mm                                 | GS.3MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 45           |   | 1     | 1    |
| 0.6 Mm                                 | GS.6MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 52.3         |   | 1     | 1    |
| 1.18 Mm                                | GS1.18MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 60.7         |   | 1     | 1    |
| 2.36 Mm                                | GS2.36MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 68.8         |   | 1     | 1    |
| 3.35 Mm                                | GS3.35MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 78.3         |   | 1     | 1    |
| 4.75 Mm                                | GS4.75MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 84.6         |   | 1     | 1    |
| 19 Mm                                  | GS19MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |
| 37.5 Mm                                | GS37.5MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |
| 75 Mm                                  | GS75MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |

Notes:

- 15Result is greater than the 'SEL' criteria [as defined by the hierarchy below]
- 15Result is greater than the 'LEL' criteria [as defined by the hierarchy below]
- 15Result is greater than the PADEP Residential Soil MSC for surface soils between 0 and 15ft. bgs

DF - Dilution Factor  
LEL - Low Ecological Level  
MDL - Laboratory Method Detection Limit  
MSC - Medium Specific Concentration  
NS - No standard currently available.  
Q - Lab Qualifier (if data was not validated)  
RL - Laboratory Reporting Detection Limit  
SEL - Severe Ecological Level

- The hierarchy for selecting the SEL:
- a. Calculated Site Specific SEL using site specific TOC (302,000 mg/kg)
- b. Ontario Sediment SEL (if no Site Specific SEL is available)
- The hierarchy for selecting the LEL:
- c. Ontario Sediment LEL
- d. NOAA ERL Sediment Benchmark (if no Ontario Sediment LEL is available)
- e. SD EPA R5 Sediment Benchmark (if no NOAA ERL is available)

Data Qualifiers

- UCompound analyzed but not detected at a level greater than or equal to the MDL.

Table 13  
Summary of Sediment Analytical Results  
AOI-10  
Sunoco Philadelphia Refinery  
Philadelphia, PA

| Chemical Name                          | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | PADEP's<br>Residential Soil<br>MSC: 0-15 ft bgs | Location ID   | SED-2        |   |       |      |
|----------------------------------------|-----------|--------------------------------------------------------------------|---|--------------------------------------------------------------------|---|-------------------------------------------------|---------------|--------------|---|-------|------|
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample ID     | SED-2_040711 |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample Date   | 4/7/2011     |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Sample Matrix | Sediment     |   |       |      |
|                                        |           |                                                                    |   |                                                                    |   |                                                 | Unit          | Result       | Q | RL    | DF   |
| Volatile Organic Compounds             |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | NS                                                                 |   | NS                                                                 |   | 130.00                                          | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | NS                                                                 |   | NS                                                                 |   | 0.01                                            | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,2-Dichlorobenzene                    | 95-50-1   | NS                                                                 |   | 0.29                                                               | e | 60.00                                           | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,2-Dichloroethane                     | 107-06-2  | NS                                                                 |   | 0.26                                                               | e | 0.50                                            | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | NS                                                                 |   | NS                                                                 |   | 110.00                                          | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,3-Dichlorobenzene                    | 541-73-1  | NS                                                                 |   | 1.32                                                               | e | 60.00                                           | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1,4-Dichlorobenzene                    | 106-46-7  | NS                                                                 |   | 0.32                                                               | e | 7.50                                            | mg/kg         | ND           | U | 0.014 | 1.15 |
| 1-Methylnaphthalene                    | 90-12-0   | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 0.039 | 10   |
| Benzene                                | 71-43-2   | NS                                                                 |   | 0.14                                                               | e | 0.50                                            | mg/kg         | ND           | U | 0.014 | 1.15 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | NS                                                                 |   | 0.43                                                               | e | 1000.00                                         | mg/kg         | ND           | U | 0.014 | 1.15 |
| Ethylbenzene                           | 100-41-4  | NS                                                                 |   | 0.18                                                               | e | 70.00                                           | mg/kg         | ND           | U | 0.014 | 1.15 |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                 |   | NS                                                                 |   | 84.00                                           | mg/kg         | ND           | U | 0.014 | 1.15 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | NS                                                                 |   | NS                                                                 |   | 2.00                                            | mg/kg         | ND           | U | 0.014 | 1.15 |
| Toluene                                | 108-88-3  | NS                                                                 |   | 1.22                                                               | e | 100.00                                          | mg/kg         | ND           | U | 0.014 | 1.15 |
| Semi-Volatile Organic Compounds        |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 2,4-Dimethylphenol                     | 105-67-9  | NS                                                                 |   | 0.30                                                               | e | 73.00                                           | mg/kg         | ND           | U | 4     | 10   |
| 2,4-Dinitrophenol                      | 51-28-5   | NS                                                                 |   | 0.01                                                               | e | 7.30                                            | mg/kg         | ND           | U | 24    | 10   |
| 2-Methylphenol (O-Cresol)              | 95-48-7   | NS                                                                 |   | 0.06                                                               | e | 180.00                                          | mg/kg         | ND           | U | 4     | 10   |
| 2-Nitrophenol                          | 88-75-5   | NS                                                                 |   | NS                                                                 |   | 29.00                                           | mg/kg         | ND           | U | 4     | 10   |
| 6-Methylchrysene                       | 1705-85-7 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 4     | 10   |
| Anthracene                             | 120-12-7  | 0.05957                                                            | a | 0.22                                                               | c | 35.00                                           | mg/kg         | ND           | U | 0.039 | 10   |
| Benzenethiol                           | 108-98-5  | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 24    | 10   |
| Benzo(A)Anthracene                     | 56-55-3   | 0.23828                                                            | a | 0.32                                                               | c | 2.50                                            | mg/kg         | ND           | U | 0.039 | 10   |
| Benzo(A)Pyrene                         | 50-32-8   | 0.23184                                                            | a | 0.37                                                               | c | 0.57                                            | mg/kg         | ND           | U | 0.039 | 10   |
| Benzo(B)Fluoranthene                   | 205-99-2  | NS                                                                 |   | 10.40                                                              | e | 4.00                                            | mg/kg         | ND           | U | 0.039 | 10   |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.05152                                                            | a | 0.17                                                               | c | 18.00                                           | mg/kg         | ND           | U | 0.039 | 10   |
| Benzo(K)Fluoranthene                   | 207-08-9  | 0.21574                                                            | a | 0.24                                                               | c | 57.00                                           | mg/kg         | ND           | U | 4     | 10   |
| Benzyl Butyl Phthalate                 | 85-68-7   | NS                                                                 |   | 1.97                                                               | e | 300.00                                          | mg/kg         | ND           | U | 4     | 10   |
| Bis(2-Ethylhexyl) Phthalate            | 117-81-7  | NS                                                                 |   | 0.18                                                               | e | 13.00                                           | mg/kg         | ND           | U | 7.9   | 10   |
| Chrysene                               | 218-01-9  | 0.07406                                                            | a | 0.34                                                               | c | 23.00                                           | mg/kg         | ND           | U | 0.039 | 10   |
| Dibenz(A,H)Acridine                    | 226-36-8  | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | ND           | U | 4     | 10   |
| Dibenz(A,H)Anthracene                  | 53-70-3   | 0.02093                                                            | a | 0.06                                                               | c | 0.57                                            | mg/kg         | ND           | U | 4     | 10   |
| Diethyl Phthalate                      | 84-66-2   | NS                                                                 |   | NS                                                                 |   | 2900.00                                         | mg/kg         | ND           | U | 4     | 10   |
| Dimethyl Phthalate                     | 131-11-3  | NS                                                                 |   | 0.32                                                               | e | NS                                              | mg/kg         | ND           | U | 4     | 10   |
| Di-N-Butyl Phthalate                   | 84-74-2   | NS                                                                 |   | NS                                                                 |   | 370.00                                          | mg/kg         | ND           | U | 4     | 10   |
| Di-N-Octylphthalate                    | 117-84-0  | NS                                                                 |   | NS                                                                 |   | 1000.00                                         | mg/kg         | ND           | U | 4     | 10   |
| Fluoranthene                           | 206-44-0  | 0.16422                                                            | a | 0.75                                                               | c | 320.00                                          | mg/kg         | ND           | U | 4     | 10   |
| Fluorene                               | 86-73-7   | 0.771512                                                           | a | 0.19                                                               | c | 300.00                                          | mg/kg         | ND           | U | 0.039 | 10   |
| Naphthalene                            | 91-20-3   | NS                                                                 |   | 0.16                                                               | d | 10.00                                           | mg/kg         | ND           | U | 0.039 | 10   |
| Phenanthrene                           | 85-01-8   | 0.02576                                                            | a | 0.56                                                               | c | 1000.00                                         | mg/kg         | ND           | U | 0.039 | 10   |
| Phenol                                 | 108-95-2  | NS                                                                 |   | 0.05                                                               | e | 200.00                                          | mg/kg         | ND           | U | 4     | 10   |
| Pyrene                                 | 129-00-0  | 0.13685                                                            | a | 0.49                                                               | c | 220.00                                          | mg/kg         | ND           | U | 0.039 | 10   |
| Metals                                 |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| Aluminum                               | 7429-90-5 | NS                                                                 |   | NS                                                                 |   | 190000.00                                       | mg/kg         | 35900        |   | 47.5  | 1    |
| Antimony                               | 7440-36-0 | NS                                                                 |   | 2.00                                                               | d | 2.70                                            | mg/kg         | ND           | U | 4.75  | 1    |
| Arsenic                                | 7440-38-2 | 33                                                                 | b | 6.00                                                               | c | 2.90                                            | mg/kg         | 91.7         |   | 4.75  | 1    |
| Barium                                 | 7440-39-3 | NS                                                                 |   | NS                                                                 |   | 820.00                                          | mg/kg         | 832          |   | 1.19  | 1    |
| Beryllium                              | 7440-41-7 | NS                                                                 |   | NS                                                                 |   | 32.00                                           | mg/kg         | ND           | U | 1.19  | 1    |
| Cadmium                                | 7440-43-9 | 10                                                                 | b | 0.60                                                               | c | 3.80                                            | mg/kg         | 2.03         |   | 1.19  | 1    |
| Calcium                                | 7440-70-2 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 166000       |   | 238   | 5    |
| Chromium, Total                        | 7440-47-3 | 110                                                                | b | 26.00                                                              | c | NS                                              | mg/kg         | 186          |   | 3.56  | 1    |
| Cobalt                                 | 7440-48-4 | NS                                                                 |   | 50.00                                                              | e | 5.00                                            | mg/kg         | 14.2         |   | 1.19  | 1    |
| Copper                                 | 7440-50-8 | 110                                                                | b | 16.00                                                              | c | 4300.00                                         | mg/kg         | 425          |   | 2.38  | 1    |
| Iron                                   | 7439-89-6 | 40000                                                              | b | 20000.00                                                           | c | 150000.00                                       | mg/kg         | 21300        |   | 47.5  | 1    |
| Lead                                   | 7439-92-1 | 250                                                                | b | 31.00                                                              | c | 45.00                                           | mg/kg         | 897          |   | 3.56  | 1    |
| Magnesium                              | 7439-95-4 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 31600        |   | 23.8  | 1    |
| Manganese                              | 7439-96-5 | 1100                                                               | b | 460.00                                                             | c | 200.00                                          | mg/kg         | 1140         |   | 1.19  | 1    |
| Mercury                                | 7439-97-6 | 2                                                                  | b | 0.20                                                               | c | 1.00                                            | mg/kg         | ND           | U | 0.229 | 1    |
| Nickel                                 | 7440-02-0 | 75                                                                 | b | 16.00                                                              | c | 65.00                                           | mg/kg         | 207          |   | 2.38  | 1    |
| Potassium                              | 7440-09-7 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 1300         |   | 119   | 1    |
| Selenium                               | 7782-49-2 | NS                                                                 |   | NS                                                                 |   | 5.00                                            | mg/kg         | ND           | U | 4.75  | 1    |
| Silver                                 | 7440-22-4 | NS                                                                 |   | 1.00                                                               | d | 10.00                                           | mg/kg         | 2.01         |   | 1.19  | 1    |
| Sodium                                 | 7440-23-5 | NS                                                                 |   | NS                                                                 |   | NS                                              | mg/kg         | 793          |   | 238   | 1    |
| Thallium                               | 7440-28-0 | NS                                                                 |   | NS                                                                 |   | 1.40                                            | mg/kg         | ND           | U | 7.13  | 1    |
| Vanadium                               | 7440-62-2 | NS                                                                 |   | NS                                                                 |   | 1500.00                                         | mg/kg         | 287          |   | 1.19  | 1    |
| Zinc                                   | 7440-66-6 | 820                                                                | b | 120.00                                                             | c | 1200.00                                         | mg/kg         | 738          |   | 4.75  | 1    |
| General Chemistry                      |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| Moisture, Percent                      | MOIST     | NS                                                                 |   | NS                                                                 |   | NS                                              | %             | 57.9         |   | 0.5   | 1    |
| Total Organic Carbon                   | TOC       | 100000                                                             | b | 10000                                                              | c | NS                                              | mg/kg         | 16100        |   | 6490  | 1    |
| Grain Size Analysis                    |           |                                                                    |   |                                                                    |   |                                                 |               |              |   |       |      |
| 0.001 Mm                               | GS.001MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | ND           | U | 1     | 1    |
| 0.002 Mm                               | GS.002MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | ND           | U | 1     | 1    |
| 0.005 Mm                               | GS.005MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | ND           | U | 1     | 1    |
| 0.02 Mm                                | GS.02MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 4            |   | 1     | 1    |
| 0.05 Mm                                | GS.05MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 8.5          |   | 1     | 1    |
| 0.064 Mm                               | GS.064MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 10.5         |   | 1     | 1    |
| 0.075 Mm                               | GS.075MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 11.6         |   | 1     | 1    |
| 0.15 Mm                                | GS.15MM   | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 14.4         |   | 1     | 1    |
| 0.3 Mm                                 | GS.3MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 23.3         |   | 1     | 1    |
| 0.6 Mm                                 | GS.6MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 48.1         |   | 1     | 1    |
| 1.18 Mm                                | GS1.18MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 65           |   | 1     | 1    |
| 2.36 Mm                                | GS2.36MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 79           |   | 1     | 1    |
| 3.35 Mm                                | GS3.35MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 84           |   | 1     | 1    |
| 4.75 Mm                                | GS4.75MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 88.2         |   | 1     | 1    |
| 19 Mm                                  | GS19MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |
| 37.5 Mm                                | GS37.5MM  | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |
| 75 Mm                                  | GS75MM    | NS                                                                 |   | NS                                                                 |   | NS                                              | % passing     | 100          |   | 1     | 1    |

Notes:

- 15Result is greater than the 'SEL' criteria [as defined by the hierarchy below]
- 15Result is greater than the 'LEL' criteria [as defined by the hierarchy below]
- 15Result is greater than the PADEP Residential Soil MSC for surface soils between 0 and 15ft. bgs

DF - Dilution Factor  
LEL - Low Ecological Level  
MDL - Laboratory Method Detection Limit  
MSC - Medium Specific Concentration  
NS - No standard currently available.  
Q - Lab Qualifier if data was not validated  
RL - Laboratory Reporting Detection Limit  
SEL - Severe Ecological Level

The hierarchy for selecting the SEL:  
a. Calculated Site Specific SEL using site specific TOC (16,100 mg/kg)  
b. Ontario Sediment SEL (if no Site Specific SEL is available)

The hierarchy for selecting the LEL:  
c. Ontario Sediment LEL  
d. NOAA ERL Sediment Benchmark (if no Ontario Sediment LEL is available)  
e. SD EPA R5 Sediment Benchmark (if no NOAA ERL is available)

Data Qualifiers

U Compound analyzed but not detected at a level greater than or equal to the MDL.

**Table 13**  
**Summary of Sediment Analytical Results**  
**AOI-10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, PA**

| Chemical Name                          | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |    | LEL<br>[or equivalent]<br>Ecological<br>Screening Criteria<br>(mg/kg) |   | PADEP's<br>Residential<br>Soil MSC: 0-15<br>ft bgs | Location ID |             | SED-3                 |          |      |       | SED-4        |          |      |       | SED-5        |          |      |  |
|----------------------------------------|-----------|--------------------------------------------------------------------|----|-----------------------------------------------------------------------|---|----------------------------------------------------|-------------|-------------|-----------------------|----------|------|-------|--------------|----------|------|-------|--------------|----------|------|--|
|                                        |           |                                                                    |    |                                                                       |   |                                                    | Sample ID   | Sample Date | SED-3_040711          |          |      |       | SED-4_040711 |          |      |       | SED-5_040711 |          |      |  |
|                                        |           |                                                                    |    |                                                                       |   |                                                    |             |             | 4/7/2011              |          |      |       | 4/7/2011     |          |      |       | 4/7/2011     |          |      |  |
|                                        |           |                                                                    |    |                                                                       |   |                                                    |             |             | Sample Matrix<br>Unit | Sediment |      |       |              | Sediment |      |       |              | Sediment |      |  |
| Result                                 | Q         | RL                                                                 | DF | Result                                                                | Q | RL                                                 | DF          | Result      |                       | Q        | RL   | DF    |              |          |      |       |              |          |      |  |
| Volatile Organic Compounds             |           |                                                                    |    |                                                                       |   |                                                    |             |             |                       |          |      |       |              |          |      |       |              |          |      |  |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | NS                                                                 |    | NS                                                                    |   | 130.00                                             | mg/kg       | 0.007       |                       | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | 0.035 |              | 0.009    | 1.03 |  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | NS                                                                 |    | NS                                                                    |   | 0.01                                               | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| 1,2-Dichlorobenzene                    | 95-50-1   | NS                                                                 |    | 0.29                                                                  | e | 60.00                                              | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| 1,2-Dichloroethane                     | 107-06-2  | NS                                                                 |    | 0.26                                                                  | e | 0.50                                               | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | NS                                                                 |    | NS                                                                    |   | 110.00                                             | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | 0.015 |              | 0.009    | 1.03 |  |
| 1,3-Dichlorobenzene                    | 541-73-1  | NS                                                                 |    | 1.32                                                                  | e | 60.00                                              | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| 1,4-Dichlorobenzene                    | 106-46-7  | NS                                                                 |    | 0.32                                                                  | e | 7.50                                               | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| 1-Methylnaphthalene                    | 90-12-0   | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | 0.034       |                       | 0.024    | 10   | 0.29  |              | 0.024    | 10   | 0.18  |              | 0.028    | 10   |  |
| Benzene                                | 71-43-2   | NS                                                                 |    | 0.14                                                                  | e | 0.50                                               | mg/kg       | 0.01        |                       | 0.006    | 0.81 | 0.032 |              | 0.007    | 0.92 | 0.041 |              | 0.009    | 1.03 |  |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | NS                                                                 |    | 0.43                                                                  | e | 1000.00                                            | mg/kg       | 0.01        |                       | 0.006    | 0.81 | 0.015 |              | 0.007    | 0.92 | 0.31  |              | 0.009    | 1.03 |  |
| Ethylbenzene                           | 100-41-4  | NS                                                                 |    | 0.18                                                                  | e | 70.00                                              | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | 0.024 |              | 0.009    | 1.03 |  |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                 |    | NS                                                                    |   | 84.00                                              | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | NS                                                                 |    | NS                                                                    |   | 2.00                                               | mg/kg       | ND          | U                     | 0.006    | 0.81 | ND    | U            | 0.007    | 0.92 | ND    | U            | 0.009    | 1.03 |  |
| Toluene                                | 108-88-3  | NS                                                                 |    | 1.22                                                                  | e | 100.00                                             | mg/kg       | ND          | U                     | 0.006    | 0.81 | 0.029 |              | 0.007    | 0.92 | 0.34  |              | 0.009    | 1.03 |  |
| Semi-Volatile Organic Compounds        |           |                                                                    |    |                                                                       |   |                                                    |             |             |                       |          |      |       |              |          |      |       |              |          |      |  |
| 2,4-Dimethylphenol                     | 105-67-9  | NS                                                                 |    | 0.30                                                                  | e | 73.00                                              | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| 2,4-Dinitrophenol                      | 51-28-5   | NS                                                                 |    | 0.01                                                                  | e | 7.30                                               | mg/kg       | ND          | U                     | 14       | 10   | ND    | U            | 14       | 10   | ND    | U            | 17       | 10   |  |
| 2-Methylphenol (O-Cresol)              | 95-48-7   | NS                                                                 |    | 0.06                                                                  | e | 180.00                                             | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| 2-Nitrophenol                          | 88-75-5   | NS                                                                 |    | NS                                                                    |   | 29.00                                              | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| 6-Methylchrysene                       | 1705-85-7 | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Anthracene                             | 120-12-7  | 0.20091                                                            | a  | 0.22                                                                  | c | 35.00                                              | mg/kg       | 0.18        |                       | 0.024    | 10   | 0.15  |              | 0.024    | 10   | 0.15  |              | 0.028    | 10   |  |
| Benzenethiol                           | 108-98-5  | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | ND          | U                     | 14       | 10   | ND    | U            | 14       | 10   | ND    | U            | 17       | 10   |  |
| Benzo(A)Anthracene                     | 56-55-3   | 0.80364                                                            | a  | 0.32                                                                  | c | 2.50                                               | mg/kg       | 0.6         |                       | 0.024    | 10   | 0.38  |              | 0.024    | 10   | 0.28  |              | 0.028    | 10   |  |
| Benzo(A)Pyrene                         | 50-32-8   | 0.78192                                                            | a  | 0.37                                                                  | c | 0.57                                               | mg/kg       | 0.37        |                       | 0.024    | 10   | 0.32  |              | 0.024    | 10   | 0.25  |              | 0.028    | 10   |  |
| Benzo(B)Fluoranthene                   | 205-99-2  | NS                                                                 |    | 10.40                                                                 | e | 4.00                                               | mg/kg       | 0.64        |                       | 0.024    | 10   | 0.42  |              | 0.024    | 10   | 0.38  |              | 0.028    | 10   |  |
| Benzo(G,H,I)Perylene                   | 191-24-2  | 0.17376                                                            | a  | 0.17                                                                  | c | 18.00                                              | mg/kg       | 0.19        |                       | 0.024    | 10   | 0.21  |              | 0.024    | 10   | 0.18  |              | 0.028    | 10   |  |
| Benzo(K)Fluoranthene                   | 207-08-9  | 0.72762                                                            | a  | 0.24                                                                  | c | 57.00                                              | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Benzyl Butyl Phthalate                 | 85-68-7   | NS                                                                 |    | 1.97                                                                  | e | 300.00                                             | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Bis(2-Ethylhexyl) Phthalate            | 117-81-7  | NS                                                                 |    | 0.18                                                                  | e | 13.00                                              | mg/kg       | ND          | U                     | 4.8      | 10   | ND    | U            | 4.8      | 10   | ND    | U            | 5.6      | 10   |  |
| Chrysene                               | 218-01-9  | 0.24978                                                            | a  | 0.34                                                                  | c | 23.00                                              | mg/kg       | 1.1         |                       | 0.024    | 10   | 0.44  |              | 0.024    | 10   | 0.35  |              | 0.028    | 10   |  |
| Dibenz(A,H)Acridine                    | 226-36-8  | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Dibenz(A,H)Anthracene                  | 53-70-3   | 0.07059                                                            | a  | 0.06                                                                  | c | 0.57                                               | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Diethyl Phthalate                      | 84-66-2   | NS                                                                 |    | NS                                                                    |   | 2900.00                                            | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Dimethyl Phthalate                     | 131-11-3  | NS                                                                 |    | 0.32                                                                  | e | NS                                                 | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Di-N-Butyl Phthalate                   | 84-74-2   | NS                                                                 |    | NS                                                                    |   | 370.00                                             | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Di-N-Octylphthalate                    | 117-84-0  | NS                                                                 |    | NS                                                                    |   | 1000.00                                            | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Fluoranthene                           | 206-44-0  | 0.55386                                                            | a  | 0.75                                                                  | c | 320.00                                             | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Fluorene                               | 86-73-7   | 2.602056                                                           | a  | 0.19                                                                  | c | 300.00                                             | mg/kg       | 0.046       |                       | 0.024    | 10   | 0.046 |              | 0.024    | 10   | 0.04  |              | 0.028    | 10   |  |
| Naphthalene                            | 91-20-3   | NS                                                                 |    | 0.16                                                                  | d | 10.00                                              | mg/kg       | 0.07        |                       | 0.024    | 10   | 0.53  |              | 0.024    | 10   | 0.68  |              | 0.028    | 10   |  |
| Phenanthrene                           | 85-01-8   | 0.08688                                                            | a  | 0.56                                                                  | c | 1000.00                                            | mg/kg       | 0.43        |                       | 0.024    | 10   | 0.53  |              | 0.024    | 10   | 0.46  |              | 0.028    | 10   |  |
| Phenol                                 | 108-95-2  | NS                                                                 |    | 0.05                                                                  | e | 200.00                                             | mg/kg       | ND          | U                     | 2.4      | 10   | ND    | U            | 2.4      | 10   | ND    | U            | 2.8      | 10   |  |
| Pyrene                                 | 129-00-0  | 0.46155                                                            | a  | 0.49                                                                  | c | 220.00                                             | mg/kg       | 1.6         |                       | 0.024    | 10   | 0.63  |              | 0.024    | 10   | 0.41  |              | 0.028    | 10   |  |
| Metals                                 |           |                                                                    |    |                                                                       |   |                                                    |             |             |                       |          |      |       |              |          |      |       |              |          |      |  |
| Aluminum                               | 7429-90-5 | NS                                                                 |    | NS                                                                    |   | 190000.00                                          | mg/kg       | 12300       |                       | 28.4     | 1    | 14300 |              | 28.7     | 1    | 22300 |              | 32.9     | 1    |  |
| Antimony                               | 7440-36-0 | NS                                                                 |    | 2.00                                                                  | d | 2.70                                               | mg/kg       | ND          | U                     | 2.84     | 1    | ND    | U            | 2.87     | 1    | ND    | U            | 3.29     | 1    |  |
| Arsenic                                | 7440-38-2 | 33                                                                 | b  | 6.00                                                                  | c | 2.90                                               | mg/kg       | 7.48        |                       | 2.84     | 1    | 21.9  |              | 2.87     | 1    | 14.6  |              | 3.29     | 1    |  |
| Barium                                 | 7440-39-3 | NS                                                                 |    | NS                                                                    |   | 820.00                                             | mg/kg       | 236         |                       | 0.71     | 1    | 96.3  |              | 0.716    | 1    | 225   |              | 0.822    | 1    |  |
| Beryllium                              | 7440-41-7 | NS                                                                 |    | NS                                                                    |   | 32.00                                              | mg/kg       | ND          | U                     | 0.71     | 1    | 0.956 |              | 0.716    | 1    | 0.936 |              | 0.822    | 1    |  |
| Cadmium                                | 7440-43-9 | 10                                                                 | b  | 0.60                                                                  | c | 3.80                                               | mg/kg       | 1.58        |                       | 0.71     | 1    | 1.26  |              | 0.716    | 1    | 1.2   |              | 0.822    | 1    |  |
| Calcium                                | 7440-70-2 | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | 7130        |                       | 28.4     | 1    | 6660  |              | 28.7     | 1    | 12600 |              | 32.9     | 1    |  |
| Chromium, Total                        | 7440-47-3 | 110                                                                | b  | 26.00                                                                 | c | NS                                                 | mg/kg       | 45.2        |                       | 2.13     | 1    | 64.7  |              | 2.15     | 1    | 66.4  |              | 2.47     | 1    |  |
| Cobalt                                 | 7440-48-4 | NS                                                                 |    | 50.00                                                                 | e | 5.00                                               | mg/kg       | 8.29        |                       | 0.71     | 1    | 7.98  |              | 0.716    | 1    | 11.5  |              | 0.822    | 1    |  |
| Copper                                 | 7440-50-8 | 110                                                                | b  | 16.00                                                                 | c | 4300.00                                            | mg/kg       | 111         |                       | 1.42     | 1    | 74.4  |              | 1.43     | 1    | 109   |              | 1.64     | 1    |  |
| Iron                                   | 7439-89-6 | 40000                                                              | b  | 20000.00                                                              | c | 150000.00                                          | mg/kg       | 19300       |                       | 28.4     | 1    | 19400 |              | 28.7     | 1    | 21700 |              | 32.9     | 1    |  |
| Lead                                   | 7439-92-1 | 250                                                                | b  | 31.00                                                                 | c | 45.00                                              | mg/kg       | 328         |                       | 2.13     | 1    | 306   |              | 2.15     | 1    | 319   |              | 2.47     | 1    |  |
| Magnesium                              | 7439-95-4 | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | 6940        |                       | 14.2     | 1    | 3870  |              | 14.3     | 1    | 7190  |              | 16.4     | 1    |  |
| Manganese                              | 7439-96-5 | 1100                                                               | b  | 460.00                                                                | c | 200.00                                             | mg/kg       | 236         |                       | 0.71     | 1    | 375   |              | 0.716    | 1    | 508   |              | 0.822    | 1    |  |
| Mercury                                | 7439-97-6 | 2                                                                  | b  | 0.20                                                                  | c | 1.00                                               | mg/kg       | 0.604       |                       | 0.139    | 1    | 0.288 |              | 0.14     | 1    | 0.524 |              | 0.156    | 1    |  |
| Nickel                                 | 7440-02-0 | 75                                                                 | b  | 16.00                                                                 | c | 65.00                                              | mg/kg       | 31.3        |                       | 1.42     | 1    | 85.6  |              | 1.43     | 1    | 44.1  |              | 1.64     | 1    |  |
| Potassium                              | 7440-09-7 | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | 2290        |                       | 71       | 1    | 1670  |              | 71.6     | 1    | 1530  |              | 82.2     | 1    |  |
| Selenium                               | 7782-49-2 | NS                                                                 |    | NS                                                                    |   | 5.00                                               | mg/kg       | ND          | U                     | 2.84     | 1    | ND    | U            | 2.87     | 1    | ND    | U            | 3.29     | 1    |  |
| Silver                                 | 7440-22-4 | NS                                                                 |    | 1.00                                                                  | d | 10.00                                              | mg/kg       | 0.969       |                       | 0.71     | 1    | 0.855 |              | 0.716    | 1    | 1.11  |              | 0.822    | 1    |  |
| Sodium                                 | 7440-23-5 | NS                                                                 |    | NS                                                                    |   | NS                                                 | mg/kg       | 295         |                       | 142      | 1    | ND    | U            | 143      | 1    | 188   |              | 164      | 1    |  |
| Thallium                               | 7440-28-0 | NS                                                                 |    | NS                                                                    |   | 1.40                                               | mg/kg       | ND          | U                     | 4.26     | 1    | ND    | U            | 4.3      | 1    | ND    | U            | 4.93     | 1    |  |
| Vanadium                               | 7440-62-2 | NS                                                                 |    | NS                                                                    |   | 1500.00                                            | mg/kg       | 50.1        |                       | 0.71     | 1    | 71.6  |              | 0.716    | 1    | 94.7  |              | 0.822    | 1    |  |
| Zinc                                   | 7440-66-6 | 820                                                                | b  | 120.00                                                                | c | 1200.00                                            | mg/kg       | 503         |                       | 2.84     | 1    | 1710  |              | 14.3     | 5    | 339   |              | 3.29     | 1    |  |
| General Chemistry                      |           |                                                                    |    |                                                                       |   |                                                    |             |             |                       |          |      |       |              |          |      |       |              |          |      |  |
| Moisture, Percent                      | MOIST     | NS                                                                 |    | NS                                                                    |   | NS                                                 | %           | 30.3        |                       | 0.5      | 1    | 30.9  |              | 0.5      | 1    | 40.4  |              | 0.5      | 1    |  |
| Total Organic Carbon                   | TOC       | 100000                                                             | b  | 10000                                                                 | c | NS                                                 | mg/kg       | 55900       |                       | 3490     | 1    | 47800 |              | 3400     | 1    | 59900 |              | 6360     | 1    |  |
| Grain Size Analysis                    |           |                                                                    |    |                                                                       |   |                                                    |             |             |                       |          |      |       |              |          |      |       |              |          |      |  |
| 0.001 Mm                               | GS.001MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | ND          | U                     | 1        | 1    | 1     |              | 1        | 1    | 2     |              | 1        | 1    |  |
| 0.002 Mm                               | GS.002MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | ND          | U                     | 1        | 1    | 2     |              | 1        | 1    | 8     |              | 1        | 1    |  |
| 0.005 Mm                               | GS.005MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 1           |                       | 1        | 1    | 3.5   |              | 1        | 1    | 12.5  |              | 1        | 1    |  |
| 0.02 Mm                                | GS.02MM   | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 3           |                       | 1        | 1    | 9.5   |              | 1        | 1    | 22.5  |              | 1        | 1    |  |
| 0.05 Mm                                | GS.05MM   | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 7.5         |                       | 1        | 1    | 13    |              | 1        | 1    | 38    |              | 1        | 1    |  |
| 0.064 Mm                               | GS.064MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 9           |                       | 1        | 1    | 14    |              | 1        | 1    | 48.5  |              | 1        | 1    |  |
| 0.075 Mm                               | GS.075MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 9.5         |                       | 1        | 1    | 14.9  |              | 1        | 1    | 53.9  |              | 1        | 1    |  |
| 0.15 Mm                                | GS.15MM   | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 14          |                       | 1        | 1    | 16.8  |              | 1        | 1    | 67.9  |              | 1        | 1    |  |
| 0.3 Mm                                 | GS.3MM    | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 26.3        |                       | 1        | 1    | 19.8  |              | 1        | 1    | 75.1  |              | 1        | 1    |  |
| 0.6 Mm                                 | GS.6MM    | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   | 44.7        |                       | 1        | 1    | 26.1  |              | 1        | 1    | 78.3  |              | 1        | 1    |  |
| 1.18 Mm                                | GS1.18MM  | NS                                                                 |    | NS                                                                    |   | NS                                                 | % passing   |             |                       |          |      |       |              |          |      |       |              |          |      |  |

**Notes:**

|    |                                                                                                 |
|----|-------------------------------------------------------------------------------------------------|
| 15 | Result is greater than the 'SEL' criteria [as defined by the hierarchy below]                   |
| 15 | Result is greater than the 'LEL' criteria [as defined by the hierarchy below]                   |
| 15 | Result is greater than the PADEP Residential Soil MSC for surface soils between 0 and 15ft. bgs |

DF - Dilution Factor

LEL - Low Ecological Level

MDL - Laboratory Method Detection Limit

MSC - Medium Specific Concentration

NS - No standard currently available.

Q - Lab Qualifier if data was not validated)

RL - Laboratory Reporting Det

The hierarchy for selecting the SEL:

- Calculated Site Specific SEL using site specific TOC (54,533.33 mg/kg)
- Ontario Sediment SEL (if no Site Specific SEL is available)

The hierarchy for selecting the LEL:

- c. Ontario Sediment LEL
- d. NOAA ERL Sediment Benchmark (if no Ontario Sediment LEL is available)
- e. SD EPA R5 Sediment Benchmark (if no NOAA ERL is available)

### Data Qualifiers

U Compound analyzed but not detected at a level greater than or equal to the MDL.

Table 14  
Summary of Soil Samples Screened for Protection of Indoor Air  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | USEPA-PA Defaults<br>Nonresidential<br>Volatilization to<br>Indoor Air<br>Screening Limit | USEPA-PA Defaults<br>Nonresidential PELs<br>Volatilization to<br>Indoor Air Screen<br>Screening Limit | Location ID     | BH-10-36      |   |        |      | BH-10-37      |   |        |      | BH-10-38      |   |       |      | BH-10-39      |   |       |       | BH-10-40      |   |        |      | BH-10-41      |   |       |      | BH-10-78      |   |        |      |
|----------------------------------------|-----------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------|---------------|---|--------|------|---------------|---|--------|------|---------------|---|-------|------|---------------|---|-------|-------|---------------|---|--------|------|---------------|---|-------|------|---------------|---|--------|------|
|                                        |           |                                                                                           |                                                                                                       | Sample ID       | BH-10-36_0-2' |   |        |      | BH-10-37_0-2' |   |        |      | BH-10-38_0-2' |   |       |      | BH-10-39_0-2' |   |       |       | BH-10-40_0-2' |   |        |      | BH-10-41_0-2' |   |       |      | BH-10-78_0-2' |   |        |      |
|                                        |           |                                                                                           |                                                                                                       | Sample Date     | 4/5/2011      |   |        |      | 4/5/2011      |   |        |      | 4/5/2011      |   |       |      | 4/5/2011      |   |       |       | 4/5/2011      |   |        |      | 4/5/2011      |   |       |      | 4/21/2011     |   |        |      |
|                                        |           |                                                                                           |                                                                                                       | Sample Matrix   | Soil          |   |        |      | Soil          |   |        |      | Soil          |   |       |      | Soil          |   |       |       | Soil          |   |        |      | Soil          |   |       |      | Soil          |   |        |      |
|                                        |           |                                                                                           |                                                                                                       | Sample Interval | 0-2 ft bgs    |   |        |      | 0-2 ft bgs    |   |        |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |       |       | 0-2 ft bgs    |   |        |      | 0-2 ft bgs    |   |       |      | 0-2 ft bgs    |   |        |      |
| Unit                                   | Result    | Q                                                                                         | RL                                                                                                    | DF              | Result        | Q | RL     | DF   | Result        | Q | RL     | DF   | Result        | Q | RL    | DF   | Result        | Q | RL    | DF    | Result        | Q | RL     | DF   | Result        | Q | RL    | DF   | Result        | Q | RL     | DF   |
| Volatile Organic Compounds             |           |                                                                                           |                                                                                                       |                 |               |   |        |      |               |   |        |      |               |   |       |      |               |   |       |       |               |   |        |      |               |   |       |      |               |   |        |      |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 29                                                                                        | 310                                                                                                   | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | 0.4           | J | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | 0.014         |   | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.29                                                                                      | 1000                                                                                                  | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | ND            | U | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | ND            | U | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.83                                                                                      | 8.3                                                                                                   | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | ND            | U | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | ND            | U | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 6.4                                                                                       | 87                                                                                                    | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | ND            | U | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | 0.007         | J | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| Benzene                                | 71-43-2   | 0.63                                                                                      | 380                                                                                                   | mg/kg           | 0.008         |   | 0.0006 | 0.91 | 0.008         |   | 0.0006 | 0.93 | ND            | U | 9E-04 | 1.52 | 0.12          | J | 0.08  | 121.6 | 0.003         | J | 0.0005 | 0.79 | 0.008         | J | 8E-04 | 1.05 | 0.001         | J | 0.0005 | 0.82 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 77                                                                                        | 170                                                                                                   | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | 0.18          | J | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | 0.012         |   | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| Ethylbenzene                           | 100-41-4  | 9.5                                                                                       | 110                                                                                                   | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | 0.24          | J | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | ND            | U | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 360                                                                                       | 360                                                                                                   | mg/kg           | ND            | U | 0.001  | 0.91 | ND            | U | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | 2.5           |   | 0.16  | 121.6 | ND            | U | 0.0009 | 0.79 | ND            | U | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 86                                                                                        | 6400                                                                                                  | mg/kg           | ND            | U | 0.0006 | 0.91 | ND            | U | 0.0006 | 0.93 | ND            | U | 9E-04 | 1.52 | ND            | U | 0.08  | 121.6 | ND            | U | 0.0005 | 0.79 | ND            | U | 8E-04 | 1.05 | ND            | U | 0.0005 | 0.82 |
| Toluene                                | 108-88-3  | 110                                                                                       | 240                                                                                                   | mg/kg           | 0.009         |   | 0.001  | 0.91 | 0.005         | J | 0.001  | 0.93 | ND            | U | 0.002 | 1.52 | ND            | U | 0.16  | 121.6 | 0.001         | J | 0.0009 | 0.79 | 0.01          |   | 0.002 | 1.05 | ND            | U | 0.001  | 0.82 |
| Semi-Volatile Organic Compounds        |           |                                                                                           |                                                                                                       |                 |               |   |        |      |               |   |        |      |               |   |       |      |               |   |       |       |               |   |        |      |               |   |       |      |               |   |        |      |
| Anthracene                             | 120-12-7  | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.46          | J | 0.2    | 5    | 1.9           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 12            |   | 2.2   | 5     | 4.7           |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.43          |   | 0.039  | 1    |
| Benzo(A)Anthracene                     | 56-55-3   | NS                                                                                        | NS                                                                                                    | mg/kg           | 1.8           |   | 0.2    | 5    | 6.5           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 22            |   | 2.2   | 5     | 11            |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.91          |   | 0.039  | 1    |
| Benzo(A)Pyrene                         | 50-32-8   | NS                                                                                        | NS                                                                                                    | mg/kg           | 1.8           |   | 0.2    | 5    | 6.5           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 16            |   | 2.2   | 5     | 9.2           |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.66          |   | 0.039  | 1    |
| Benzo(B)Fluoranthene                   | 205-99-2  | NS                                                                                        | NS                                                                                                    | mg/kg           | 2.4           |   | 0.2    | 5    | 9.3           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 25            |   | 2.2   | 5     | 12            |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.81          |   | 0.039  | 1    |
| Benzo(G,H,I)Perylene                   | 191-24-2  | NS                                                                                        | NS                                                                                                    | mg/kg           | 1.3           |   | 0.2    | 5    | 3.9           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 9.9           | J | 2.2   | 5     | 4.8           |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.33          |   | 0.039  | 1    |
| Chrysene                               | 218-01-9  | NS                                                                                        | NS                                                                                                    | mg/kg           | 2.2           |   | 0.2    | 5    | 6.2           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 23            |   | 2.2   | 5     | 10            |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.82          |   | 0.039  | 1    |
| Fluorene                               | 86-73-7   | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.2    | 5    | 0.83          | J | 0.21   | 5    | ND            | U | 0.2   | 5    | 7             | J | 2.2   | 5     | 1.3           |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.14          | J | 0.039  | 1    |
| Naphthalene                            | 91-20-3   | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.39          | J | 0.2    | 5    | 1.1           |   | 0.21   | 5    | ND            | U | 0.2   | 5    | ND            | U | 2.2   | 5     | 0.51          | J | 0.19   | 5    | ND            | U | 1.2   | 5    | 0.085         | J | 0.039  | 1    |
| Phenanthrene                           | 85-01-8   | NS                                                                                        | NS                                                                                                    | mg/kg           | 1.9           |   | 0.2    | 5    | 8.6           |   | 0.21   | 5    | 0.24          | J | 0.2   | 5    | 50            |   | 2.2   | 5     | 18            |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 1.3           |   | 0.039  | 1    |
| Pyrene                                 | 129-00-0  | NS                                                                                        | NS                                                                                                    | mg/kg           | 3.1           |   | 0.2    | 5    | 10            |   | 0.21   | 5    | ND            | U | 0.2   | 5    | 51            |   | 2.2   | 5     | 20            |   | 0.19   | 5    | ND            | U | 1.2   | 5    | 1.3           |   | 0.039  | 1    |
| Metals                                 |           |                                                                                           |                                                                                                       |                 |               |   |        |      |               |   |        |      |               |   |       |      |               |   |       |       |               |   |        |      |               |   |       |      |               |   |        |      |
| Lead                                   | 7439-92-1 | NS                                                                                        | NS                                                                                                    | mg/kg           | 390           |   | 0.0627 | 10   | 540           |   | 0.132  | 20   | 11.6          |   | 0.012 | 2    | 415           |   | 0.068 | 10    | 65.1          |   | 0.0121 | 2    | 186           |   | 0.039 | 5    | 79.3          |   | 0.0123 | 2    |
| General Chemistry                      |           |                                                                                           |                                                                                                       |                 |               |   |        |      |               |   |        |      |               |   |       |      |               |   |       |       |               |   |        |      |               |   |       |      |               |   |        |      |
| Moisture, Percent                      | MOIST     | NS                                                                                        | NS                                                                                                    | %               | 18.7          |   | 0.5    | 1    | 21.8          |   | 0.5    | 1    | 16.9          |   | 0.5   | 1    | 23.9          |   | 0.5   | 1     | 15            |   | 0.5    | 1    | 34            |   | 0.5   | 1    | 15.3          |   | 0.5    | 1    |

**Notes:**  
DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

**Qualifiers:**  
Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  

10

 - Result exceeds the USEPA-PA Default Nonresidential Volatilization to Indoor Air  

10

 - Result Exceeds the USEPA-PA Defaults Nonresidential PELs Volatilization to Indoor Air Screen

Table 14  
Summary of Soil Samples Screened for Protection of Indoor Air  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | USEPA-PA Defaults<br>Nonresidential<br>Volatilization to<br>Indoor Air<br>Screening Limit | USEPA-PA Defaults<br>Nonresidential PELs<br>Volatilization to<br>Indoor Air Screen<br>Screening Limit | Location ID     | BH-10-79      |   |        |     | BH-10-80      |   |        |      | W-1D       |   |        |     | W-29       |   |        |      | W-30       |   |       |      | W-31       |   |       |       |
|----------------------------------------|-----------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------|---------------|---|--------|-----|---------------|---|--------|------|------------|---|--------|-----|------------|---|--------|------|------------|---|-------|------|------------|---|-------|-------|
|                                        |           |                                                                                           |                                                                                                       | Sample ID       | BH-10-79 0-2' |   |        |     | BH-10-80 0-2' |   |        |      | W-1D 0-2'  |   |        |     | W-29 0-2'  |   |        |      | W-30@0'-2' |   |       |      | W-31@0'-2' |   |       |       |
|                                        |           |                                                                                           |                                                                                                       | Sample Date     | 4/21/2011     |   |        |     | 4/21/2011     |   |        |      | 4/5/2011   |   |        |     | 4/19/2011  |   |        |      | 4/15/2011  |   |       |      | 4/15/2011  |   |       |       |
|                                        |           |                                                                                           |                                                                                                       | Sample Matrix   | Soil          |   |        |     | Soil          |   |        |      | Soil       |   |        |     | Soil       |   |        |      | Soil       |   |       |      | Soil       |   |       |       |
|                                        |           |                                                                                           |                                                                                                       | Sample Interval | 0-2 ft bgs    |   |        |     | 0-2 ft bgs    |   |        |      | 0-2 ft bgs |   |        |     | 0-2 ft bgs |   |        |      | 0-2 ft bgs |   |       |      | 0-2 ft bgs |   |       |       |
|                                        |           |                                                                                           |                                                                                                       | Unit            | Result        | Q | RL     | DF  | Result        | Q | RL     | DF   | Result     | Q | RL     | DF  | Result     | Q | RL     | DF   | Result     | Q | RL    | DF   | Result     | Q | RL    | DF    |
| Volatile Organic Compounds             |           |                                                                                           |                                                                                                       |                 |               |   |        |     |               |   |        |      |            |   |        |     |            |   |        |      |            |   |       |      |            |   |       |       |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 29                                                                                        | 310                                                                                                   | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | 0.004      | J | 0.003 | 1.45 | 0.092      | J | 0.075 | 63.87 |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 0.29                                                                                      | 1000                                                                                                  | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | ND         | U | 0.003 | 1.45 | ND         | U | 0.075 | 63.87 |
| 1,2-Dichloroethane                     | 107-06-2  | 0.83                                                                                      | 8.3                                                                                                   | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | ND         | U | 0.003 | 1.45 | ND         | U | 0.075 | 63.87 |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 6.4                                                                                       | 87                                                                                                    | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | 0.003      | J | 0.003 | 1.45 | 0.086      | J | 0.075 | 63.87 |
| Benzene                                | 71-43-2   | 0.63                                                                                      | 380                                                                                                   | mg/kg           | 0.004         | J | 0.0005 | 0.8 | 0.009         |   | 0.0005 | 0.81 | 0.001      | J | 0.0005 | 0.8 | 0.004      | J | 0.0005 | 0.95 | 0.012      | J | 0.001 | 1.45 | 0.089      | J | 0.037 | 63.87 |
| Dimethyl Benzene/ Xylenes, Total       | 1330-20-7 | 77                                                                                        | 170                                                                                                   | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | 0.001      | J | 0.001  | 0.95 | ND         | U | 0.003 | 1.45 | 0.14       | J | 0.075 | 63.87 |
| Ethylbenzene                           | 100-41-4  | 9.5                                                                                       | 110                                                                                                   | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | ND         | U | 0.003 | 1.45 | 0.076      | J | 0.075 | 63.87 |
| Isopropylbenzene (Cumene)              | 98-82-8   | 360                                                                                       | 360                                                                                                   | mg/kg           | ND            | U | 0.0009 | 0.8 | ND            | U | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | ND         | U | 0.001  | 0.95 | ND         | U | 0.003 | 1.45 | 0.4        |   | 0.075 | 63.87 |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 86                                                                                        | 6400                                                                                                  | mg/kg           | ND            | U | 0.0005 | 0.8 | ND            | U | 0.0005 | 0.81 | ND         | U | 0.0005 | 0.8 | ND         | U | 0.0005 | 0.95 | ND         | U | 0.001 | 1.45 | ND         | U | 0.037 | 63.87 |
| Toluene                                | 108-88-3  | 110                                                                                       | 240                                                                                                   | mg/kg           | 0.001         | J | 0.0009 | 0.8 | 0.001         | J | 0.001  | 0.81 | ND         | U | 0.0009 | 0.8 | 0.006      |   | 0.001  | 0.95 | 0.004      | J | 0.003 | 1.45 | 0.094      | J | 0.075 | 63.87 |
| Semi-Volatile Organic Compounds        |           |                                                                                           |                                                                                                       |                 |               |   |        |     |               |   |        |      |            |   |        |     |            |   |        |      |            |   |       |      |            |   |       |       |
| Anthracene                             | 120-12-7  | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 0.57          |   | 0.04   | 1    | 2.3        |   | 0.19   | 5   | 0.83       |   | 0.038  | 1    | ND         | U | 0.057 | 1    | 0.49       | J | 0.39  | 10    |
| Benzo(A)Anthracene                     | 56-55-3   | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.041         | J | 0.038  | 1   | 1.7           |   | 0.04   | 1    | 3.7        |   | 0.19   | 5   | 0.9        |   | 0.038  | 1    | 0.07       | J | 0.057 | 1    | 0.78       | J | 0.39  | 10    |
| Benzo(A)Pyrene                         | 50-32-8   | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.046         | J | 0.038  | 1   | 1.4           |   | 0.04   | 1    | 2.7        |   | 0.19   | 5   | 0.84       |   | 0.038  | 1    | ND         | U | 0.057 | 1    | 0.59       | J | 0.39  | 10    |
| Benzo(B)Fluoranthene                   | 205-99-2  | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.046         | J | 0.038  | 1   | 1.9           |   | 0.04   | 1    | 3.7        |   | 0.19   | 5   | 0.97       |   | 0.038  | 1    | ND         | U | 0.057 | 1    | 0.54       | J | 0.39  | 10    |
| Benzo(G,H,I)Perylene                   | 191-24-2  | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 0.79          |   | 0.04   | 1    | 1.4        |   | 0.19   | 5   | 0.76       |   | 0.038  | 1    | ND         | U | 0.057 | 1    | ND         | U | 0.39  | 10    |
| Chrysene                               | 218-01-9  | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 1.6           |   | 0.04   | 1    | 3.2        |   | 0.19   | 5   | 1.1        |   | 0.038  | 1    | 0.4        |   | 0.057 | 1    | 2.6        |   | 0.39  | 10    |
| Fluorene                               | 86-73-7   | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 0.15          | J | 0.04   | 1    | 1          |   | 0.19   | 5   | 0.14       | J | 0.038  | 1    | ND         | U | 0.057 | 1    | ND         | U | 0.39  | 10    |
| Naphthalene                            | 91-20-3   | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 0.18          | J | 0.04   | 1    | 0.42       | J | 0.19   | 5   | 1.3        |   | 0.038  | 1    | 0.11       | J | 0.057 | 1    | ND         | U | 0.39  | 10    |
| Phenanthrene                           | 85-01-8   | NS                                                                                        | NS                                                                                                    | mg/kg           | ND            | U | 0.038  | 1   | 1.9           |   | 0.04   | 1    | 7.9        |   | 0.19   | 5   | 1.4        |   | 0.038  | 1    | 0.35       |   | 0.057 | 1    | 0.51       | J | 0.39  | 10    |
| Pyrene                                 | 129-00-0  | NS                                                                                        | NS                                                                                                    | mg/kg           | 0.042         | J | 0.038  | 1   | 2.9           |   | 0.04   | 1    | 6.9        |   | 0.19   | 5   | 1.5        |   | 0.038  | 1    | 0.28       | J | 0.057 | 1    | 2.2        |   | 0.39  | 10    |
| Metals                                 |           |                                                                                           |                                                                                                       |                 |               |   |        |     |               |   |        |      |            |   |        |     |            |   |        |      |            |   |       |      |            |   |       |       |
| Lead                                   | 7439-92-1 | NS                                                                                        | NS                                                                                                    | mg/kg           | 145           |   | 0.0292 | 5   | 234           |   | 0.0599 | 10   | 76.5       |   | 0.0116 | 2   | 259        |   | 0.0575 | 10   | 1990       |   | 0.431 | 50   | 955        |   | 0.152 | 25    |
| General Chemistry                      |           |                                                                                           |                                                                                                       |                 |               |   |        |     |               |   |        |      |            |   |        |     |            |   |        |      |            |   |       |      |            |   |       |       |
| Moisture, Percent                      | MOIST     | NS                                                                                        | NS                                                                                                    | %               | 12.6          |   | 0.5    | 1   | 16.5          |   | 0.5    | 1    | 13.6       |   | 0.5    | 1   | 13.9       |   | 0.5    | 1    | 42         |   | 0.5   | 1    | 14.6       |   | 0.5   | 1     |

Notes:

DF - Dilution Factor  
mg/kg - milligram per kilogram  
MSC - PADEP's Medium Specific Concentration for Soil  
PADEP - Pennsylvania Department of Environmental Protection  
RL - Reporting Limit  
ND - Not Detected  
NS - No Standard

All soil samples collected and analyzed were unsaturated.

Qualifiers:

Q - Qualifier  
U - The analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

Exceedance Summary:

10 - Result exceeds the USEPA-PA Default Nonresidential Volatilization to Indoor Air  
10 - Result Exceeds the USEPA-PA Defaults Nonresidential PELs Volatilization to Indoor Air Screen



Table 15  
Summary of Groundwater Analytical Results Screened for Protection of Indoor Air  
April 2011  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| Chemical Name                          | CAS No    | USEPA-PA Defaults<br>NonResidential<br>Volatilization to<br>Indoor Air Screening<br>Limit | Location      | W-1          |   |        |    | W-1D          |   |        |    | W-2          |   |        |    | W-25          |   |        |    | W-26          |   |        |    | W-27          |   |        |    | W-29          |   |        |    |
|----------------------------------------|-----------|-------------------------------------------------------------------------------------------|---------------|--------------|---|--------|----|---------------|---|--------|----|--------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|---------------|---|--------|----|
|                                        |           |                                                                                           | Sample ID     | W-1_04272011 |   |        |    | W-1D_04262011 |   |        |    | W-2_04262011 |   |        |    | W-25_04262011 |   |        |    | W-26_04262011 |   |        |    | W-27_04262011 |   |        |    | W-29_04262011 |   |        |    |
|                                        |           |                                                                                           | Sample Date   | 4/27/2011    |   |        |    | 4/26/2011     |   |        |    | 4/26/2011    |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    | 4/26/2011     |   |        |    |
|                                        |           |                                                                                           | Sample Matrix | Groundwater  |   |        |    | Groundwater   |   |        |    | Groundwater  |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    | Groundwater   |   |        |    |
|                                        |           |                                                                                           | Unit          | Result       | Q | RL     | DF | Result        | Q | RL     | DF | Result       | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF | Result        | Q | RL     | DF |
| Volatile Organic Compounds             |           |                                                                                           |               |              |   |        |    |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| 1,2,4-Trimethylbenzene                 | 95-63-6   | 12000                                                                                     | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,2-Dibromoethane (Ethylene Dibromide) | 106-93-4  | 1000                                                                                      | ug/l          | ND           | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND           | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0095 | 1  | ND            | U | 0.0094 | 1  |
| 1,2-Dichloroethane                     | 107-06-2  | 4600                                                                                      | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| 1,3,5-Trimethylbenzene (Mesitylene)    | 108-67-8  | 10000                                                                                     | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Benzene                                | 71-43-2   | 5900                                                                                      | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Ethylbenzene                           | 100-41-4  | 45000                                                                                     | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Isopropylbenzene (Cumene)              | 98-82-8   | NS                                                                                        | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Tert-Butyl Methyl Ether                | 1634-04-4 | 640000                                                                                    | ug/l          | 2            |   | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  | ND            | U | 0.5    | 1  | 0.6           | J | 0.5    | 1  |
| Toluene                                | 108-88-3  | NS                                                                                        | ug/l          | ND           | U | 0.5    | 1  | 0.8           | J | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Xylenes (Total)                        | 1330-20-7 | NS                                                                                        | ug/l          | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND           | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  | ND            | U | 0.5    | 1  |
| Semi Volatile Organic Compounds        |           |                                                                                           |               |              |   |        |    |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Chrysene                               | 218-01-9  | NS                                                                                        | ug/l          | 20           |   | 1      | 1  | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  |
| Fluorene                               | 86-73-7   | NS                                                                                        | ug/l          | 13           |   | 1      | 1  | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | 1             | J | 0.9    | 1  |
| Naphthalene                            | 91-20-3   | NS                                                                                        | ug/l          | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  |
| Phenanthrene                           | 85-01-8   | NS                                                                                        | ug/l          | 13           |   | 1      | 1  | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | 2             | J | 0.9    | 1  |
| Pyrene                                 | 129-00-0  | NS                                                                                        | ug/l          | 37           |   | 1      | 1  | ND            | U | 1      | 1  | ND           | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 1      | 1  | ND            | U | 0.9    | 1  |
| Metals                                 |           |                                                                                           |               |              |   |        |    |               |   |        |    |              |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |               |   |        |    |
| Lead (Dissolved)                       | 7439-92-1 | NS                                                                                        | ug/l          | ND           | U | 0.052  | 1  | ND            | U | 0.052  | 1  | ND           | U | 0.052  | 1  | ND            | U | 0.052  | 1  | ND            | U | 0.052  | 1  | 0.11          | J | 0.052  | 1  | ND            | U | 0.052  | 1  |

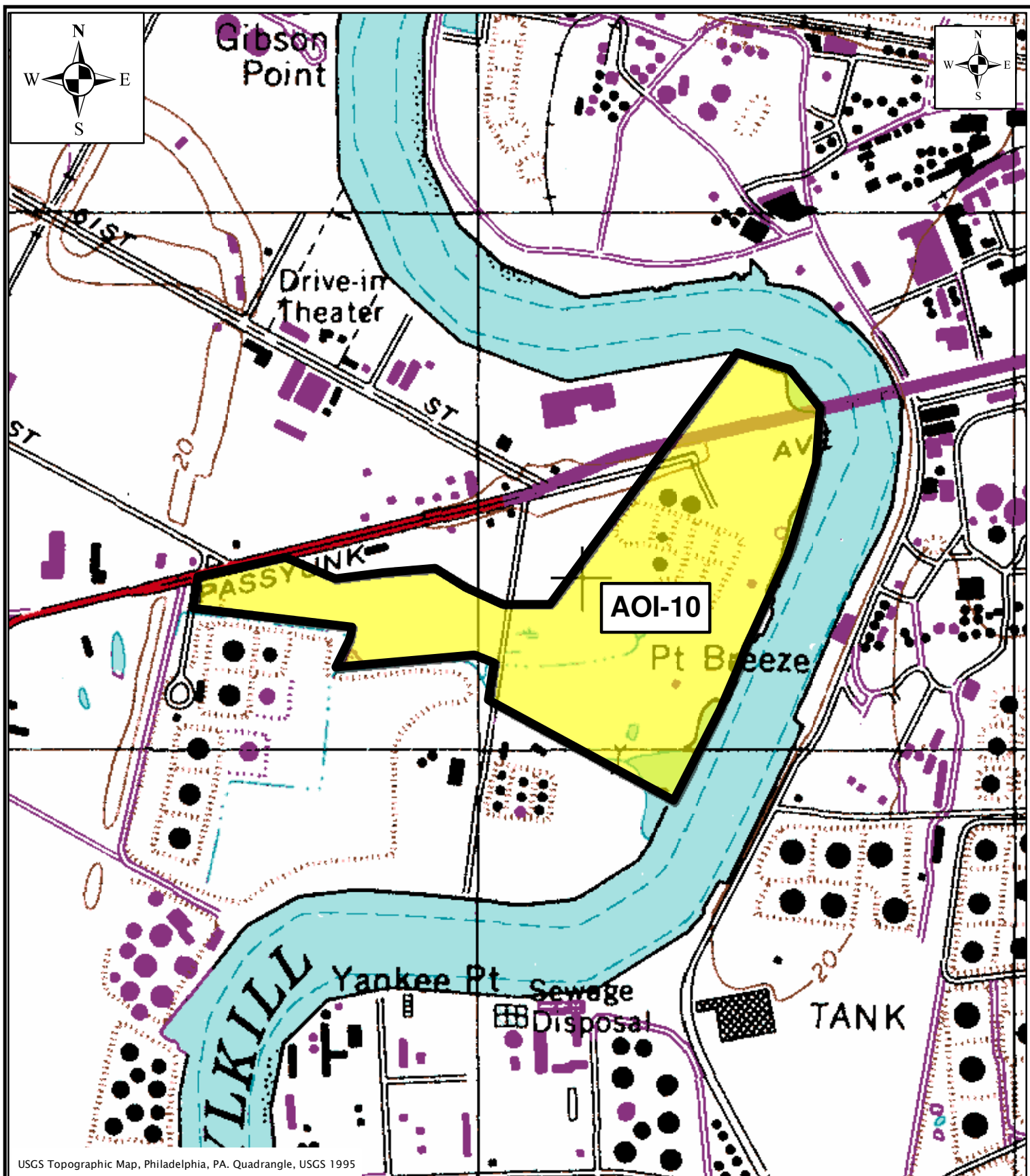
**Notes:**  
DF - Dilution Factor  
PADEP - Pennsylvania Department of Environmental Protection  
ug/l - Micrograms per liter  
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater  
RL - Reporting limit (limit of quantitation)  
ND - Not detected

**Qualifiers:**  
Q - Qualifier  
U - Analyte was analyzed but not detected  
J - Compound detected but below the reporting limit (the value given is an estimate).

**Exceedance Summary:**  
**10** - Result exceeds the PADEP Non-Residential Indoor Air Standard

## FIGURES



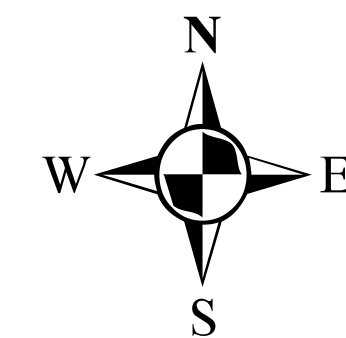


**Sunoco, Inc. (R&M)**  
**Philadelphia Refinery**  
 3144 Passyunk Avenue  
 Philadelphia, PA. 19145

**Figure 1: Site Location Map**  
 AOI-10 Site Characterization Report/  
 Remedial Investigation Report  
 Philadelphia Sunoco Philadelphia Refinery Pennsylvania

|                   |                         |               |
|-------------------|-------------------------|---------------|
| <b>Job Number</b> | <b>Scale: 1" = 800'</b> | <b>Date</b>   |
| 2574601           | 0 400 800 Feet          | June 13, 2011 |





**Legend**

 Area of Interest Boundary (AOI)

Notes:  
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.

Figure 2 - Site Plan  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania



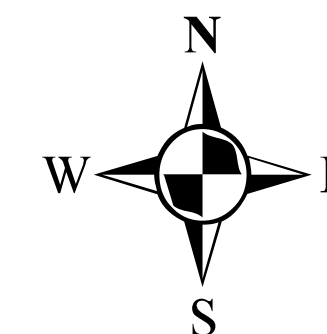
Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: 04/02/2011  
DRAWN BY: MSH  
CHECKED BY: DWH  
JOB#: 2574861

Path: \\langan.com\data\DT\data\2574861\ArcGIS\MapDocuments\AOI 10 SCR\Figure 2 - Site Plan\_6-2-11.mxd





### Legend

- BH-10-36 Shallow Soil Boring and Sample Location (0-2 ft.)
- BH-10-48 Deep Soil Boring With No Waste and Shallow Soil Sample Location (0-2 ft.)
- BH-10-56-WC CAMU Soil Boring With Waste and Vertical Delineation Soil Samples
- SWS-1 Surface Water Sample Location
- SED-1 Sediment Sample Location
- W-22 New Shallow Groundwater Monitoring Well with Shallow Soil Sample
- W-10D New Intermediate Groundwater Monitoring Well with Shallow Soil Sample
- W-48 Intermediate Monitoring Well Location
- W-41 Shallow Monitoring Well Location
- W-7 Damaged/Abandoned/Unable to Locate Monitoring Well Location
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- Area of Interest Boundary (AOI)

Notes:  
1. Bing's Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.  
2. Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.

Figure 3 - Completed Activities  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania



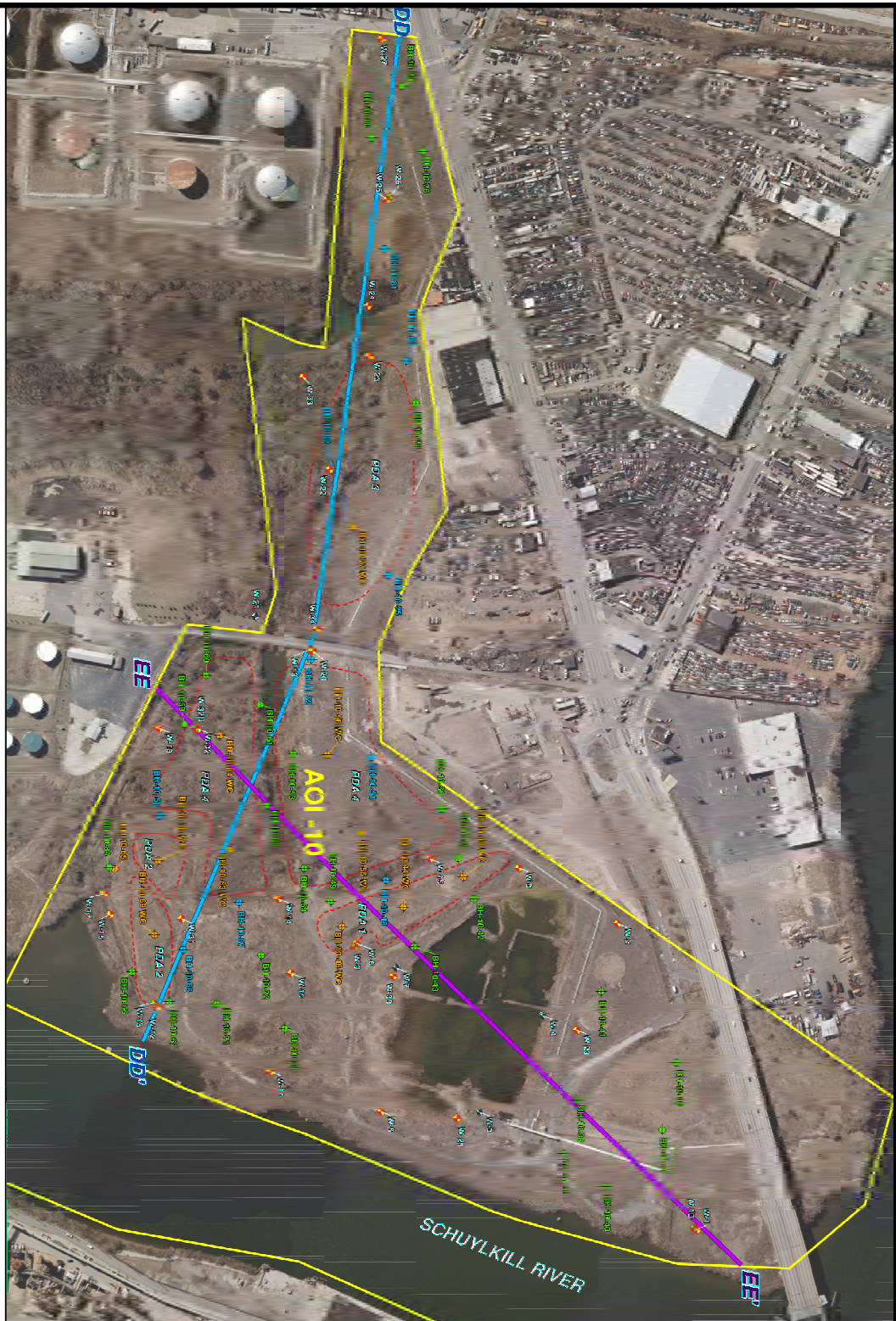
Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: May 6, 2011  
DRN: B1, B2  
CRD: B1, B2  
JOB#: 2574861

Path: \\langan.com\data\2574861\ArcGIS\MapDocuments\AOI 10 SCR\Figure 3 - Completed Activities Plan\_rev5-27-11.mxd

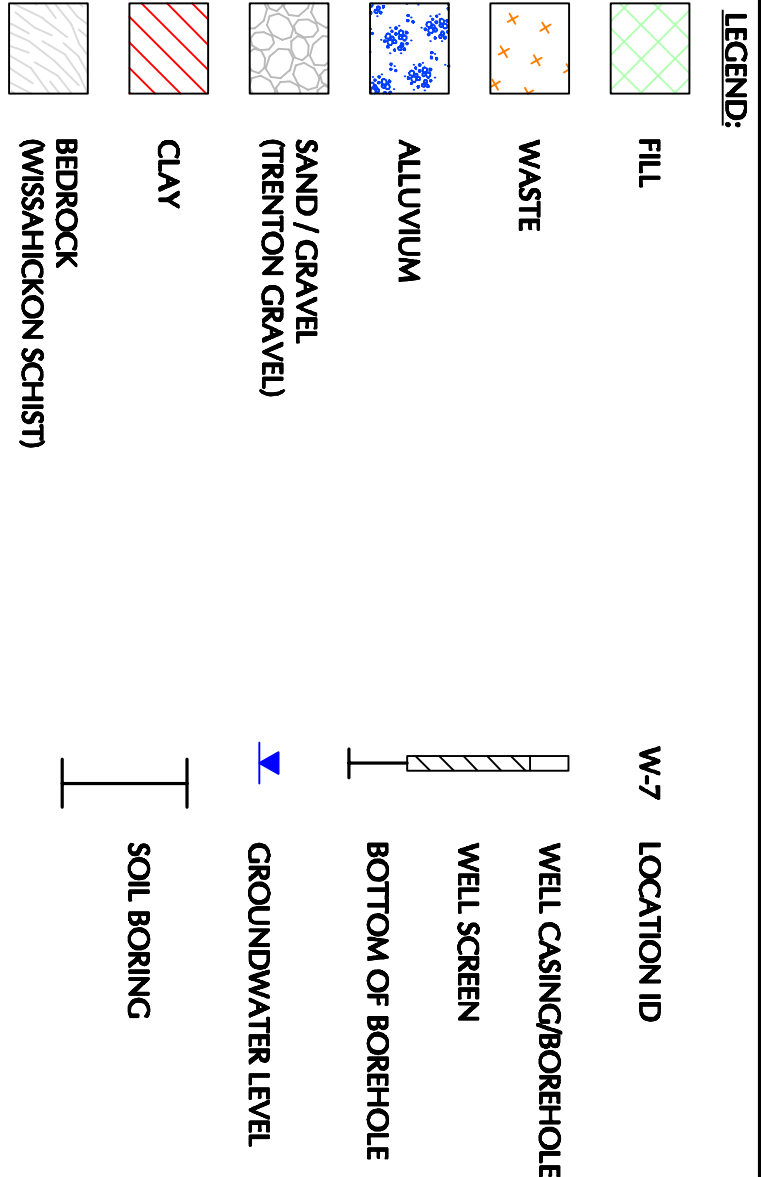




KEY MAP

N.T.S.

- NOTES:
- LITHOLOGY BASED ON INTERPOLATION FROM AVAILABLE NEW AND HISTORIC WELL / SOIL BORING LOGS.
  - GROUNDWATER ELEVATIONS COLLECTED IN APRIL 2011.
  - WELLS W-12 AND W-13 ARE NOT LOCATED WITHIN PDA2. THESE WELLS WERE PROJECTED ONTO CROSS-SECTION FOR LITHOLOGY PURPOSES.
  - PAST DISPOSAL AREAS (PDA) WERE APPROXIMATED FROM FIELD DELINEATION SOIL BORINGS AND ENSER'S FIGURE 9 DEEP AQUIFER PIEZOMETRIC MAP DATED APRIL 17, 1992.



AOI - 10

PDA 3

PDA 4

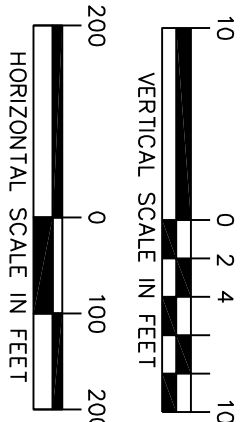
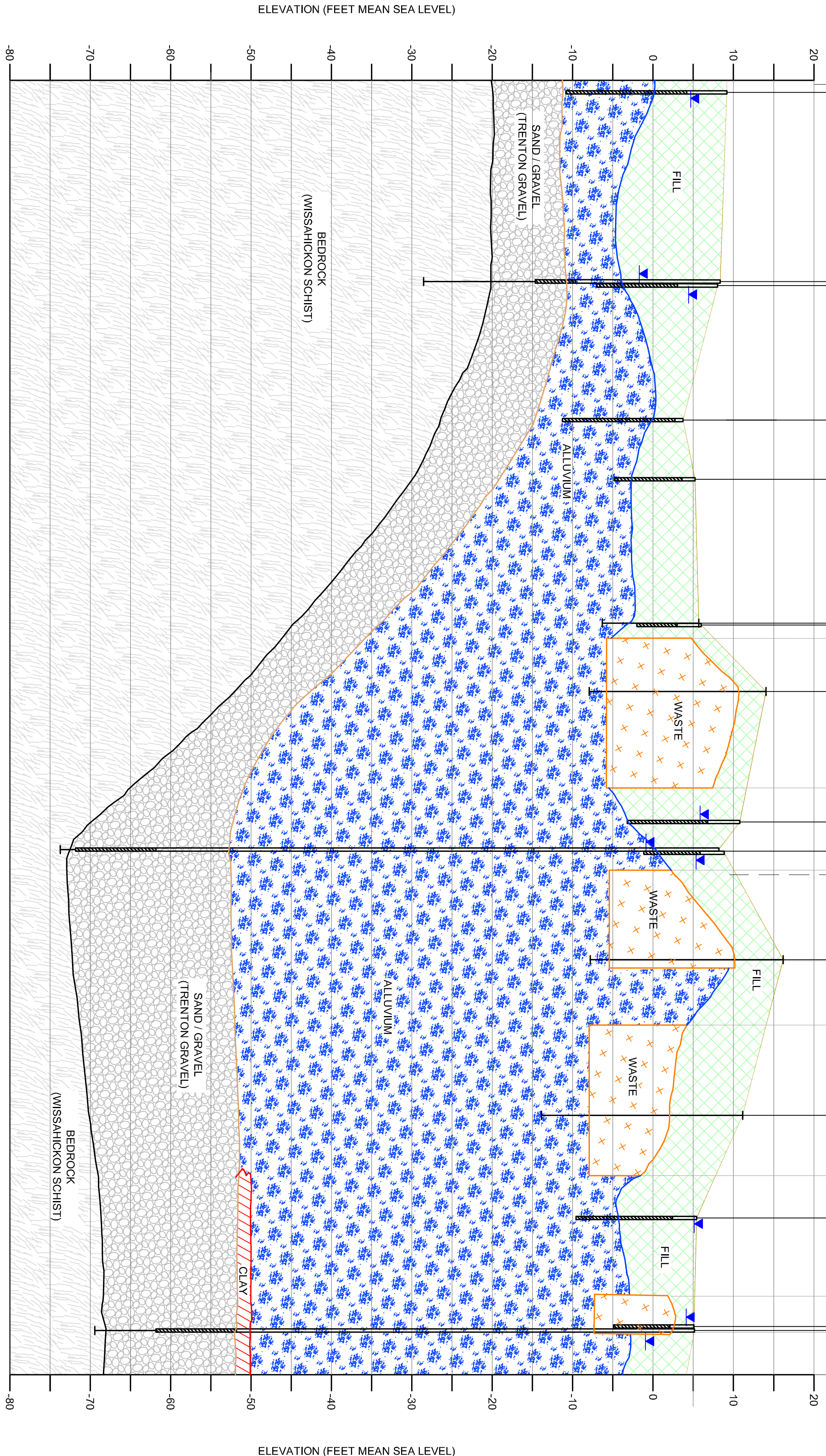
PDA 4

PDA 2

DD

DD'

SCHUYLKILL RIVER



SUNOCO  
PHILADELPHIA  
REFINERY

GEOLOGIC CROSS  
SECTION DD-DD'

Project No. 2574601

Figure No.

Date 6/1/2011

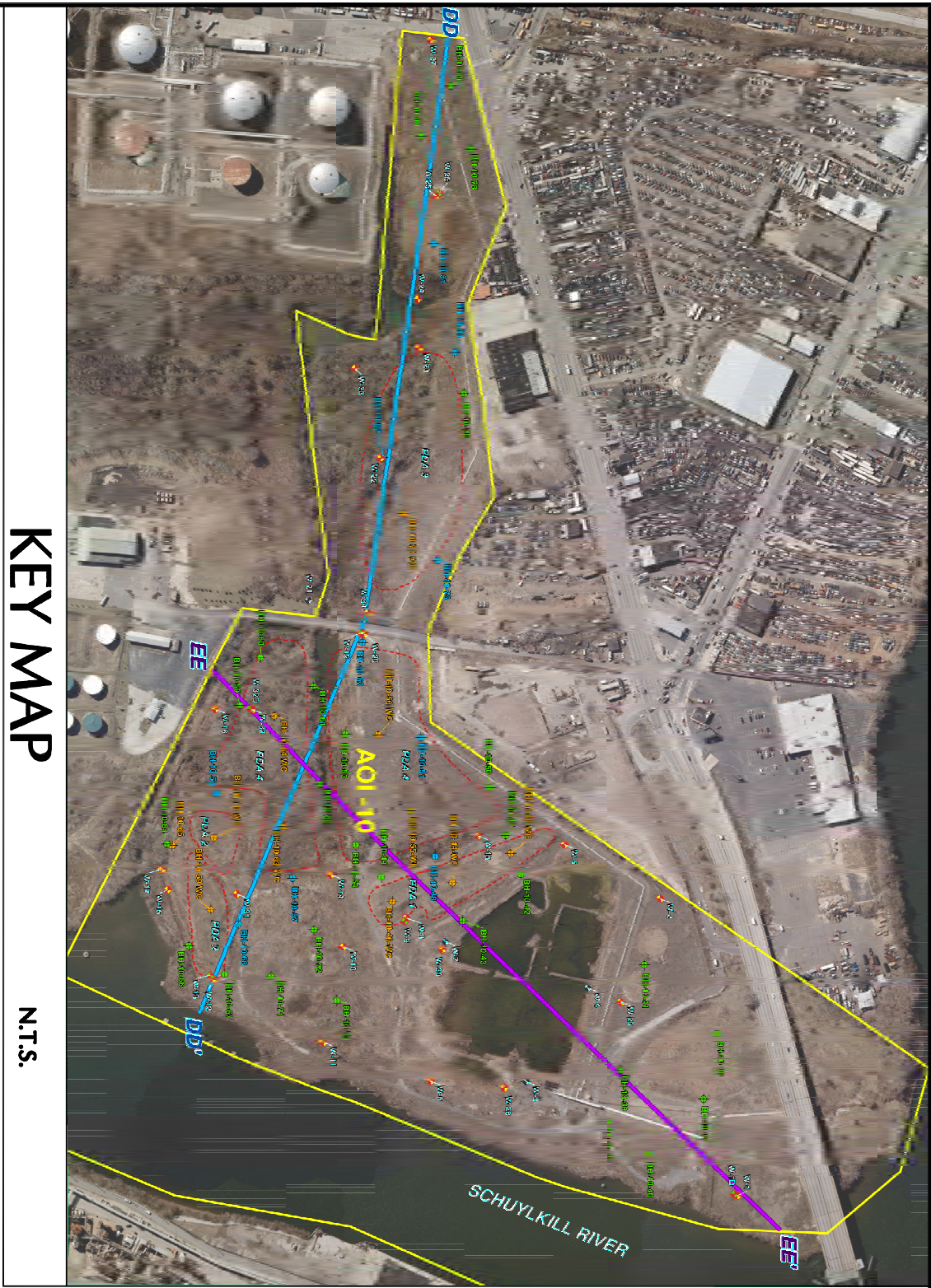
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1" = 10' VER.

Dwn. By JEM

Last Revised X

4A

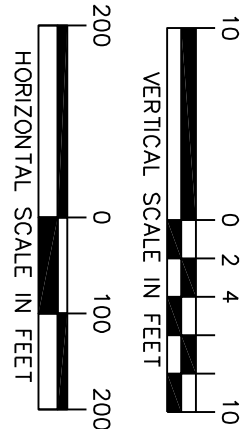
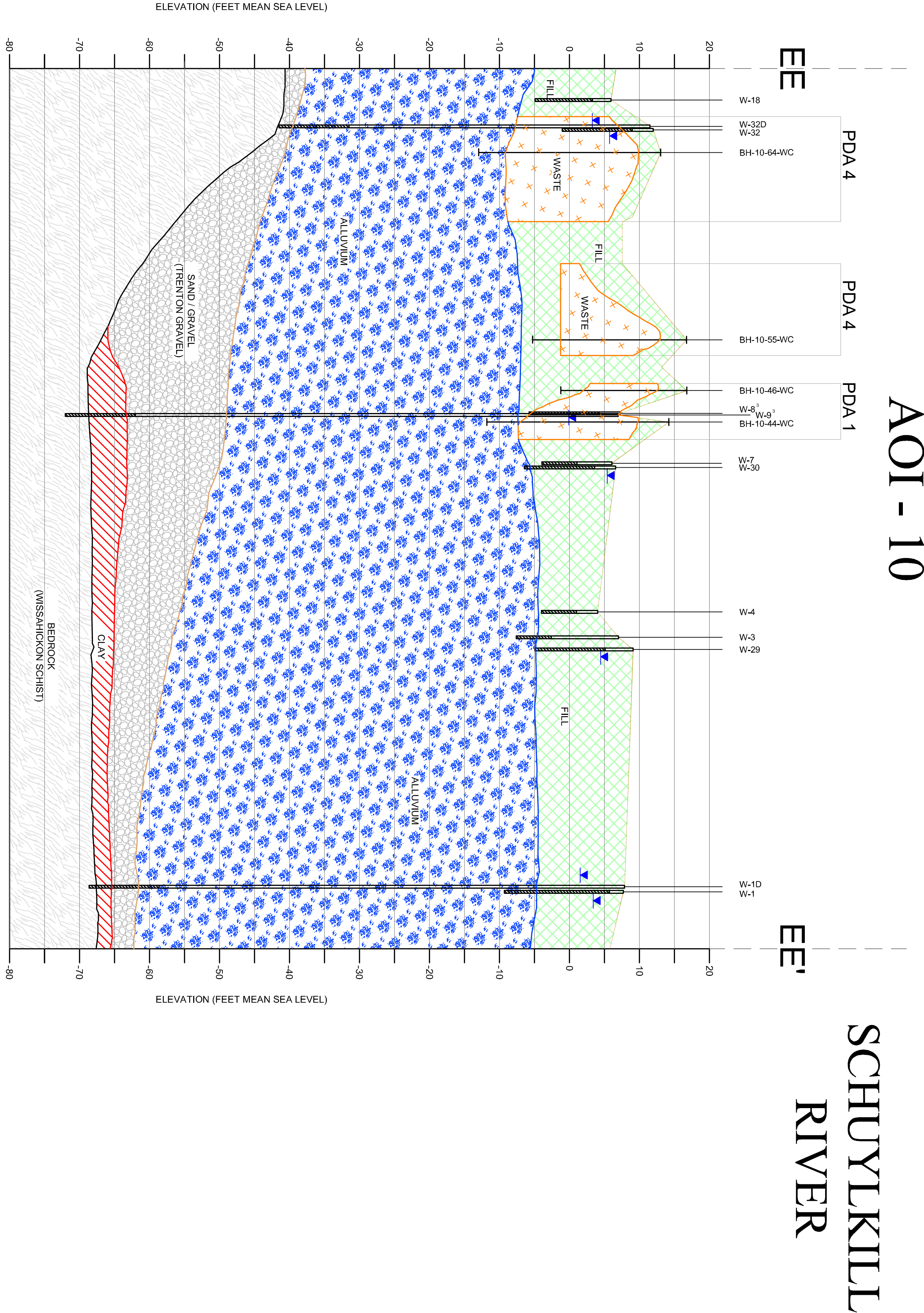
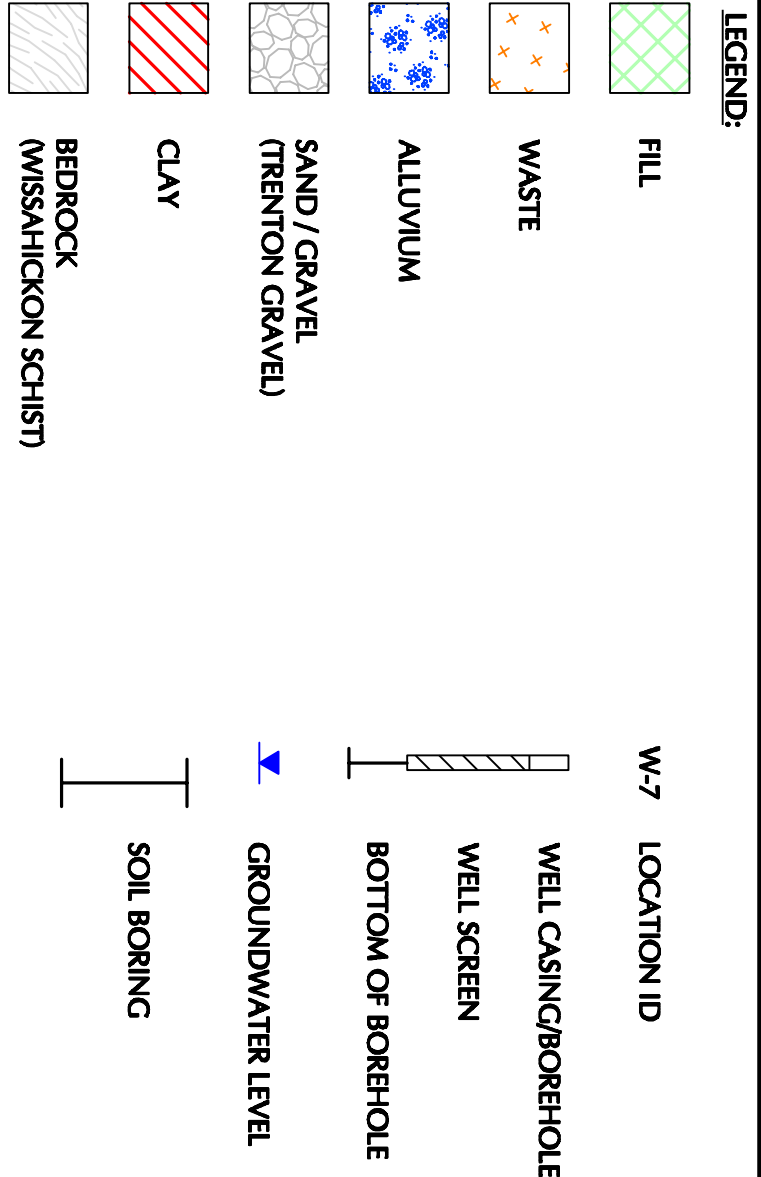




KEY MAP

N.T.S.

- NOTES:
- LITHOLOGY BASED ON INTERPOLATION FROM AVAILABLE NEW AND HISTORIC WELL / SOIL BORING LOGS.
  - GROUNDWATER ELEVATIONS COLLECTED IN APRIL 2011.
  - WELLS W-4 AND W-8 ARE NOT LOCATED WITHIN PDA1. THESE WELLS WERE PROJECTED ONTO CROSS-SECTION FOR LITHOLOGY PURPOSES.
  - PAST DISPOSAL AREAS (PDA) WERE APPROXIMATED FROM FIELD DELINEATION SOIL BORINGS AND ENSR'S FIGURE 9 DEEP AQUIFER PIEZOMETRIC MAP DATED APRIL 17, 1992.



SUNOCO  
PHILADELPHIA  
REFINERY

PHILADELPHIA COUNTY PENNSYLVANIA

GEOLOGIC CROSS  
SECTION EE-EE'

Project Drawing Title

Project No. 2574601 Figure No.

Date 6/1/2011

Scale 1" = 200' HOR.  
1" = 10' VER.

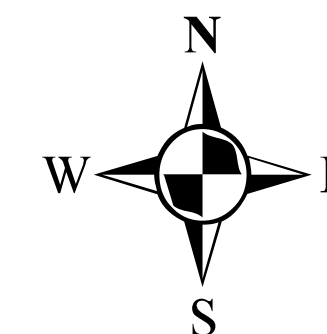
Dwn. By JEM

Lost / Revised X

4B

Of





### Legend

- W-1 3.39 Shallow Monitoring Well Location
- W-21 NA Abandoned/Unable to Locate
- W-18 NA Shallow Monitoring Well With LNAPL
- Shallow Groundwater Contours
- Inferred Shallow Groundwater Contours
- Area of Interest Boundary (AOI)

Notes:  
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.

Figure 5 - Shallow Groundwater Elevation Contour Plan  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania



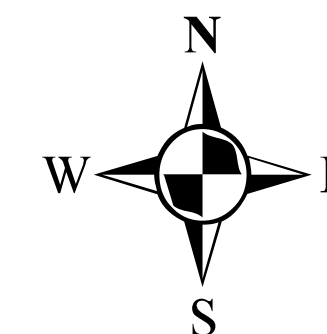
Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: 04-2-2011  
DRN: B11 M4  
CRD: B11 D11  
JOB#: 2574861

Path: \\langan.com\data\DT\data\2574861\ArcGIS\MapDocuments\AOI 10 SCR\Figure 5 - Shallow GW Contours, 6-2-11.mxd





### Legend

- Intermediate Monitoring Well Location
- Intermediate Groundwater Contours
- Inferred Intermediate Groundwater Contours
- Area of Interest Boundary (AOI)

Notes:  
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.

Figure 6 - Intermediate Groundwater Elevation Contour Plan  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania



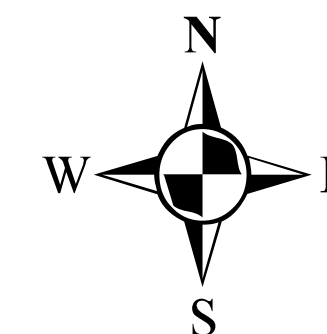
Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: 04/02/2011  
DRN: B71 M4  
CRD: B71 D71  
JOB#: 2574861

Path: \\langan.com\data\DT\data\2574861\ArcGIS\MapDocuments\AOI 10 SCR\Figure 6 - Intermediate GW Contours\_6-2-11.mxd





## Legend

- BH-10-37\_0-2' Metals in mg/kg Lead - 540
- BH-10-82\_0-2' Metals in mg/kg Lead - 584
- BH-10-76\_0-2'
- BH-10-66\_0-2'
- W-31\_0-2' Metals in mg/kg Lead - 955
- New Monitoring Well Location with Shallow Soil Sample Exceeding PADEP Non-Res Soil MSCs
- New Monitoring Well Location with Shallow Soil Sample Not Exceeding PADEP Non-Res Soil MSCs
- New Monitoring Well Location with No Shallow Soil Sample Collected
- Existing Monitoring Point
- Damaged/Abandoned/Unable to Locate
- Lead Exceedance of Site Specific Standard (1,708 mg/kg)
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- Area of Interest Boundary (AOI)

## PADEP Non-Res Unsaturated Soil MSC

Benzene = 0.5 mg/kg  
Benzo(A)Pyrene = 11 mg/kg  
Lead = 450 mg/kg  
Arsenic = 29 mg/kg  
Manganese = 2,000 mg/kg  
PCE = 0.5 mg/kg

- Notes:
- Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
  - Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.
  - Soil samples collected in April 2011 by Aquaterra.

Figure 7 - Summary of Soil Sample Exceedances:  
Non CAMU Areas  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

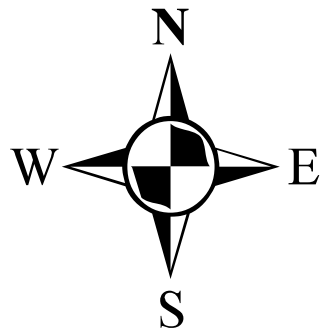


Sunoco, Inc. (R&M)  
Philadelphia Refinery  
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Philadelphia, PA.  
19145

0 75 150 300 Feet

SCALE: 1" = 150'  
DATE: June 2, 2011  
DRN: B71 MB  
CDD: B71 D7H  
J254: 2574861





### Legend

- New CAMU Soil Boring Location With Exceedances of PADEP Non-Res Soil MSCs
- 937** Exceeds PADEP Non-Res Soil MSC
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- Area of Interest Boundary (AOI)

|                        | PADEP Non-Res<br>Unsaturated Soil MSC<br>(mg/kg) | PADEP Non-Res<br>Saturated Soil MSC<br>(mg/kg) |
|------------------------|--------------------------------------------------|------------------------------------------------|
| <b>VOCs</b>            |                                                  |                                                |
| Benzene                | 0.5                                              | 0.5                                            |
| 1,2 Dichloroethane     | 0.5                                              | 0.5                                            |
| Ethylbenzene           | 70                                               | 70                                             |
| Methylene Chloride     | 0.5                                              | 0.5                                            |
| PCE                    | 0.5                                              | 0.5                                            |
| Toulene                | 100                                              | 100                                            |
| <b>SVOCs</b>           |                                                  |                                                |
| 2-Methylnaphthalene    | 1600                                             | 160                                            |
| Benzo(A)Pyrene         | 11                                               | 4.6                                            |
| Dibenzofuran           | 260                                              | 26                                             |
| Dibenzo(A,H)Anthracene | 11                                               | 16                                             |
| Napthalene             | 25                                               | 10                                             |
| <b>Metals</b>          |                                                  |                                                |
| Antimony               | 27                                               | 2.7                                            |
| Arsenic                | 29                                               | 2.9                                            |
| Barium                 | 8200                                             | 820                                            |
| Cobalt                 | 140                                              | 14                                             |
| Lead                   | 450                                              | 45                                             |
| Manganese              | 2000                                             | 200                                            |
| Mercury                | 10                                               | 1                                              |
| Nickel                 | 650                                              | 65                                             |
| Thallium               | 14                                               | 1.4                                            |
| Zinc                   | 12000                                            | 1200                                           |

- Notes:
- Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
  - Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.
  - Soil samples collected in April 2011 by Aquaterra.

Figure 8 - Summary of Soil Sample Exceedances:  
CAMU Area  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

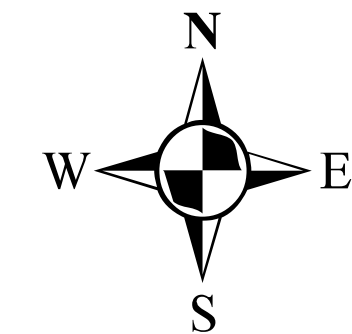


Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300 Feet

SCALE: 1" = 150'  
DATE: June 2, 2011  
DRN: B7, M4  
CDD: B7, D14  
JOB#: 2574801





### Legend

- Post Excavation Soil Sample Location With No Exceedances of PADEP Unsaturated Soil MSCs
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- Area of Interest Boundary (AOI)

- Notes:
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
  2. Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.
  3. Soil samples were collected by Stantec in May 2010.
  4. Post excavation soil samples were collected from unsaturated soil.

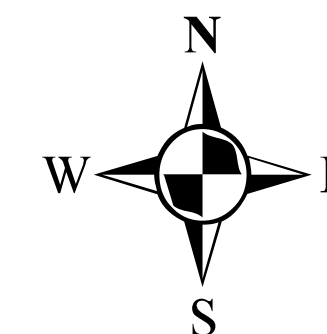
Figure 9 - VGO Release Area Post Excavation Soil Sample Results  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

**SUNOCO**  
Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: May 6, 2011  
DRN: B71 MB  
CRD: B71 D71  
JOB#: 2574861





### Legend

- W-1  
VOCs in ug/L  
Benzene - 20
- Shallow Monitoring Well with Exceedance of PADEP Non-Res Groundwater MSCs
- W-8
- Shallow Monitoring Well with LNAPL Occurrence
- W-41
- Shallow Monitoring Well with No Exceedance of PADEP Non-Res Groundwater MSCs
- W-42
- Intermediate Monitoring Well with No Exceedance of PADEP Non-Res Groundwater MSCs
- W-6
- Monitoring Point Not Sampled
- W-21
- Abandoned/Unable to Locate
- PDA 1
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- AOI-10
- Area of Interest Boundary (AOI)

### PADEP Non-Res Used Aquifer MSC for Groundwater

Benzene = 5 ug/L  
Chrysene = 1.9 ug/L  
Naphthalene = 100 ug/L  
Lead = 5 ug/L

- Notes:
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
  2. Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation boring.
  3. Groundwater samples collected in April 2011 by Aquaterra.

Figure 10 - Summary of Groundwater Sample Exceedances  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

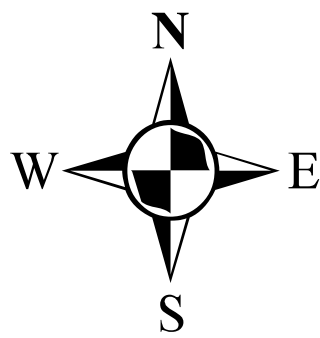


Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: June 2, 2011  
DRN: B71 M4  
CRD: B71 D14  
JOB#: 2574861





| Chemical Name        | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | PADEP's<br>Residential Soil<br>MSC: 0-15 ft bgs | SED-1<br>(results in<br>mg/kg) |
|----------------------|-----------|--------------------------------------------------------------------|---|--------------------------------------------------------------------|---|-------------------------------------------------|--------------------------------|
| SVOCs                |           |                                                                    |   |                                                                    |   |                                                 |                                |
| Anthracene           | 120-12-7  | 0.37                                                               | a | 0.22                                                               | c | 35.00                                           | 0.66                           |
| Benzo(G,H,I)Perylene | 191-24-2  | 0.32                                                               | a | 0.17                                                               | c | 18.00                                           | 0.64                           |
| Chrysene             | 218-01-9  | 0.46                                                               | a | 0.34                                                               | c | 23.00                                           | 0.89                           |
| Phenanthrene         | 85-01-8   | 0.16                                                               | a | 0.56                                                               | c | 1000.00                                         | 2.3                            |
| Pyrene               | 129-00-0  | 0.85                                                               | a | 0.49                                                               | c | 220.00                                          | 1.2                            |
| Metals               |           |                                                                    |   |                                                                    |   |                                                 |                                |
| Arsenic              | 7440-38-2 | 33                                                                 | b | 6.00                                                               | c | 2.90                                            | 24                             |
| Cadmium              | 7440-43-9 | 10                                                                 | b | 0.60                                                               | c | 3.80                                            | 2.22                           |
| Chromium, Total      | 7440-47-3 | 110                                                                | b | 26.00                                                              | c | NS                                              | 89.7                           |
| Copper               | 7440-50-8 | 110                                                                | b | 16.00                                                              | c | 4300.00                                         | 573                            |
| Iron                 | 7439-89-6 | 40000                                                              | b | 20000.00                                                           | c | 150000.00                                       | 44500                          |
| Lead                 | 7439-92-1 | 250                                                                | b | 31.00                                                              | c | 45.00                                           | 3610                           |
| Manganese            | 7439-96-5 | 1100                                                               | b | 460.00                                                             | c | 200.00                                          | 461                            |
| Mercury              | 7439-97-6 | 2                                                                  | a | 0.20                                                               | c | 1.00                                            | 3.59                           |
| Nickel               | 7440-02-0 | 75                                                                 | b | 16.00                                                              | c | 65.00                                           | 45.6                           |
| Selenium             | 7782-49-2 | NS                                                                 |   | NS                                                                 |   | 5.00                                            | 5.3                            |
| Silver               | 7440-22-4 | NS                                                                 |   | 1.00                                                               | d | 10.00                                           | 2.96                           |
| Zinc                 | 7440-66-6 | 820                                                                | b | 120.00                                                             | c | 1200.00                                         | 503                            |
| General Chemistry    |           |                                                                    |   |                                                                    |   |                                                 |                                |
| Total Organic Carbon | TOC       | 100000                                                             | b | 10000                                                              | c | NS                                              | 302000                         |

| Chemical Name        | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological<br>Screening Criteria<br>(mg/kg) |   | PADEP's<br>Residential<br>Soil MSC: 0-15<br>ft bgs | SED-3<br>(results in<br>mg/kg) |
|----------------------|-----------|--------------------------------------------------------------------|---|-----------------------------------------------------------------------|---|----------------------------------------------------|--------------------------------|
| SVOCs                |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Benzo(A)Anthracene   | 56-55-3   | 0.80364                                                            | a | 0.32                                                                  | c | 2.50                                               | 0.6                            |
| Benzo(G,H,I)Perylene | 191-24-2  | 0.17376                                                            | a | 0.17                                                                  | c | 18.00                                              | 0.19                           |
| Chrysene             | 218-01-9  | 0.24978                                                            | a | 0.34                                                                  | c | 23.00                                              | 1.1                            |
| Phenanthrene         | 85-01-8   | 0.08688                                                            | a | 0.56                                                                  | c | 1000.00                                            | 0.43                           |
| Pyrene               | 129-00-0  | 0.46155                                                            | a | 0.49                                                                  | c | 220.00                                             | 1.6                            |
| Metals               |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Arsenic              | 7440-38-2 | 33                                                                 | b | 6.00                                                                  | c | 2.90                                               | 7.48                           |
| Cadmium              | 7440-43-9 | 10                                                                 | b | 0.60                                                                  | c | 3.80                                               | 1.58                           |
| Chromium, Total      | 7440-47-3 | 110                                                                | b | 26.00                                                                 | c | NS                                                 | 45.2                           |
| Cobalt               | 7440-48-4 | NS                                                                 |   | 50.00                                                                 | e | 5.00                                               | 8.29                           |
| Copper               | 7440-50-8 | 110                                                                | b | 16.00                                                                 | c | 4300.00                                            | 111                            |
| Lead                 | 7439-92-1 | 250                                                                | b | 31.00                                                                 | c | 45.00                                              | 328                            |
| Manganese            | 7439-96-5 | 1100                                                               | b | 460.00                                                                | c | 200.00                                             | 236                            |
| Mercury              | 7439-97-6 | 2                                                                  | a | 0.20                                                                  | c | 1.00                                               | 0.604                          |
| Nickel               | 7440-02-0 | 75                                                                 | b | 16.00                                                                 | c | 65.00                                              | 31.3                           |
| Zinc                 | 7440-66-6 | 820                                                                | b | 120.00                                                                | c | 1200.00                                            | 503                            |
| General Chemistry    |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Total Organic Carbon | TOC       | 100000                                                             | b | 10000                                                                 | c | NS                                                 | 55900                          |

| Chemical Name        | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) | LEL<br>[or equivalent]<br>Ecological<br>Screening Criteria<br>(mg/kg) | PADEP's<br>Residential<br>Soil MSC: 0-15<br>ft bgs | SED-4<br>(results in<br>mg/kg) |         |       |
|----------------------|-----------|--------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|--------------------------------|---------|-------|
| SVOCs                |           |                                                                    |                                                                       |                                                    |                                |         |       |
| Benzo(A)Anthracene   | 56-55-3   | 0.80364                                                            | a                                                                     | 0.32                                               | c                              | 2.50    | 0.38  |
| Benzo(G,H,I)Perylene | 191-24-2  | 0.17376                                                            | a                                                                     | 0.17                                               | c                              | 18.00   | 0.21  |
| Chrysene             | 218-01-9  | 0.24978                                                            | a                                                                     | 0.34                                               | c                              | 23.00   | 0.44  |
| Naphthalene          | 91-20-3   | NS                                                                 |                                                                       | 0.16                                               | d                              | 10.00   | 0.53  |
| Phenanthrene         | 85-01-8   | 0.08688                                                            | a                                                                     | 0.56                                               | c                              | 1000.00 | 0.53  |
| Pyrene               | 129-00-0  | 0.46155                                                            | a                                                                     | 0.49                                               | c                              | 220.00  | 0.63  |
| Metals               |           |                                                                    |                                                                       |                                                    |                                |         |       |
| Arsenic              | 7440-38-2 | 33                                                                 | b                                                                     | 6.00                                               | c                              | 2.90    | 21.9  |
| Cadmium              | 7440-43-9 | 10                                                                 | b                                                                     | 0.60                                               | c                              | 3.80    | 1.26  |
| Chromium, Total      | 7440-47-3 | 110                                                                | b                                                                     | 26.00                                              | c                              | NS      | 64.7  |
| Cobalt               | 7440-48-4 | NS                                                                 |                                                                       | 50.00                                              | e                              | 5.00    | 7.98  |
| Copper               | 7440-50-8 | 110                                                                | b                                                                     | 16.00                                              | c                              | 4300.00 | 74.4  |
| Lead                 | 7439-92-1 | 250                                                                | b                                                                     | 31.00                                              | c                              | 45.00   | 306   |
| Manganese            | 7439-96-5 | 1100                                                               | b                                                                     | 460.00                                             | c                              | 200.00  | 375   |
| Mercury              | 7439-97-6 | 2                                                                  | a                                                                     | 0.20                                               | c                              | 1.00    | 0.288 |
| Nickel               | 7440-02-0 | 75                                                                 | b                                                                     | 16.00                                              | c                              | 65.00   | 85.6  |
| Zinc                 | 7440-66-6 | 820                                                                | b                                                                     | 120.00                                             | c                              | 1200.00 | 1710  |
| General Chemistry    |           |                                                                    |                                                                       |                                                    |                                |         |       |
| Total Organic Carbon | TOC       | 100000                                                             | b                                                                     | 10000                                              | c                              | NS      | 47800 |

### Legend

- SWS-1** Surface Water Sample Locations With No Exceedances of the PA State Code Title 25, Chapter 93 Water Quality Standards
- SED-4** Sediment Sample Locations With Exceedances of Screening Criteria
- 15** Result is Greater Than the SEL Criteria
- 15** Result is Greater Than the LEL Criteria
- 15** Result is Greater Than the PADEP Residential Soil MSC for Surface Soils between 0 and 15 ft. bgs.
- Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- Area of Interest Boundary (AOI)
- DF - Dilution Factor  
LEL - Low Ecological Level  
MDL - Laboratory Method Detection Limit  
MSC - Medium Specific Concentration  
NS - No standard currently available.  
Q - Lab Qualifier if data was not validated)  
RL - Laboratory Reporting Detection Limit  
SEL - Severe Ecological Level

- Notes:
1. Bings Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
  2. Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.
  3. Sediment and surface water samples collected by Aquaterra and Langan on April 7, 2011.
  4. The hierarchy for selecting the SEL:  
a. Calculated Site Specific SEL using TOC for designated reach  
b. Ontario Sediment SEL  
The hierarchy for selecting the LEL:  
c. Ontario Sediment LEL  
d. NOAA ERL Sediment Benchmark (if no Ontario Sediment LEL is available)  
e. SD EPA R5 Sediment Benchmark (if no NOAA ERL is available)

Figure 11 - Summary of Sediment and Surface Water Exceedances  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300 Feet

SCALE: 1" = 150'  
DATE: 04/12/2011  
DRN: 871 M4  
CDD: 871 D14  
JOB#: 2574801

| Chemical Name        | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | PADEP's<br>Residential Soil<br>MSC: 0-15 ft bgs | SED-2<br>(results in<br>mg/kg) |
|----------------------|-----------|--------------------------------------------------------------------|---|--------------------------------------------------------------------|---|-------------------------------------------------|--------------------------------|
| Metals               |           |                                                                    |   |                                                                    |   |                                                 |                                |
| Arsenic              | 7440-38-2 | 33                                                                 | b | 6.00                                                               | c | 2.90                                            | 91.7                           |
| Barium               | 7440-39-3 | NS                                                                 |   | NS                                                                 |   | 820.00                                          | 832                            |
| Cadmium              | 7440-43-9 | 10                                                                 | b | 0.60                                                               | c | 3.80                                            | 2.03                           |
| Chromium, Total      | 7440-47-3 | 110                                                                | b | 26.00                                                              | c | NS                                              | 186                            |
| Cobalt               | 7440-48-4 | NS                                                                 |   | 50.00                                                              | e | 5.00                                            | 14.2                           |
| Copper               | 7440-50-8 | 110                                                                | b | 16.00                                                              | c | 4300.00                                         | 425                            |
| Iron                 | 7439-89-6 | 40000                                                              | b | 20000.00                                                           | c | 150000.00                                       | 21300                          |
| Lead                 | 7439-92-1 | 250                                                                | b | 31.00                                                              | c | 45.00                                           | 897                            |
| Manganese            | 7439-96-5 | 1100                                                               | b | 460.00                                                             | c | 200.00                                          | 1140                           |
| Nickel               | 7440-02-0 | 75                                                                 | b | 16.00                                                              | c | 65.00                                           | 207                            |
| Silver               | 7440-22-4 | NS                                                                 |   | 1.00                                                               | d | 10.00                                           | 2.01                           |
| Zinc                 | 7440-66-6 | 820                                                                | b | 120.00                                                             | c | 1200.00                                         | 738                            |
| General Chemistry    |           |                                                                    |   |                                                                    |   |                                                 |                                |
| Total Organic Carbon | TOC       | 100000                                                             | b | 10000                                                              | c | NS                                              | 16100                          |

| Chemical Name        | CAS No    | SEL<br>[or equivalent]<br>Ecological Screening<br>Criteria (mg/kg) |   | LEL<br>[or equivalent]<br>Ecological<br>Screening Criteria<br>(mg/kg) |   | PADEP's<br>Residential<br>Soil MSC: 0-15<br>ft bgs | SED-5<br>(results in<br>mg/kg) |
|----------------------|-----------|--------------------------------------------------------------------|---|-----------------------------------------------------------------------|---|----------------------------------------------------|--------------------------------|
| SVOCs                |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Benzo(G,H,I)Perylene | 191-24-2  | 0.17376                                                            | a | 0.17                                                                  | c | 18.00                                              | 0.18                           |
| Chrysene             | 218-01-9  | 0.24978                                                            | a | 0.34                                                                  | c | 23.00                                              | 0.35                           |
| Naphthalene          | 91-20-3   | NS                                                                 |   | 0.16                                                                  | d | 10.00                                              | 0.68                           |
| Phenanthrene         | 85-01-8   | 0.08688                                                            | a | 0.56                                                                  | c | 1000.00                                            | 0.46                           |
| Metals               |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Arsenic              | 7440-38-2 | 33                                                                 | b | 6.00                                                                  | c | 2.90                                               | 14.6                           |
| Cadmium              | 7440-43-9 | 10                                                                 | b | 0.60                                                                  | c | 3.80                                               | 1.2                            |
| Chromium, Total      | 7440-47-3 | 110                                                                | b | 26.00                                                                 | c | NS                                                 | 66.4                           |
| Cobalt               | 7440-48-4 | NS                                                                 |   | 50.00                                                                 | e | 5.00                                               | 11.5                           |
| Copper               | 7440-50-8 | 110                                                                | b | 16.00                                                                 | c | 4300.00                                            | 109                            |
| Iron                 | 7439-89-6 | 40000                                                              | b | 20000.00                                                              | c | 150000.00                                          | 21700                          |
| Lead                 | 7439-92-1 | 250                                                                | b | 31.00                                                                 | c | 45.00                                              | 319                            |
| Manganese            | 7439-96-5 | 1100                                                               | b | 460.00                                                                | c | 200.00                                             | 508                            |
| Mercury              | 7439-97-6 | 2                                                                  | a | 0.20                                                                  | c | 1.00                                               | 0.524                          |
| Nickel               | 7440-02-0 | 75                                                                 | b | 16.00                                                                 | c | 65.00                                              | 44.1                           |
| Silver               | 7440-22-4 | NS                                                                 |   | 1.00                                                                  | d | 10.00                                              | 1.11                           |
| Zinc                 | 7440-66-6 | 820                                                                | b | 120.00                                                                | c | 1200.00                                            | 339                            |
| General Chemistry    |           |                                                                    |   |                                                                       |   |                                                    |                                |
| Total Organic Carbon | TOC       | 100000                                                             | b | 10000                                                                 | c | NS                                                 | 59900                          |



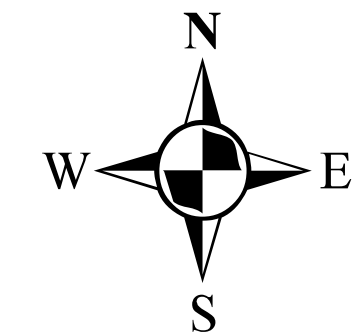




## **APPENDIX A**

Current and Historic Use Figure





#### Legend

- █ Current Uses
- █ Historic Uses
- - - Past Disposal Area (PDA) - Corrective Action Management Unit (CAMU)
- ▭ Area of Interest Boundary (AOI)

Notes:  
1. Bing's Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.  
2. Past disposal area digitized from ENSR Figure 9 - Deep Aquifer Piezometric Map dated April 17, 1992. PDA boundaries updated based on 2011 delineation borings.

Figure A-1 - Historic Use/Current Use  
AOI-10 Site Characterization/  
Remedial Investigation Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)  
Philadelphia Refinery  
3144 Passyunk Avenue  
Philadelphia, PA.  
19145

0 75 150 300  
Feet

SCALE: 1" = 150'  
DATE: May 6, 2011  
DRAWN BY: MSH  
CHECKED BY: DWH  
JOB#: 2574601

Path: \\langan.com\data\DT\data\2574601\ArcGIS\MapDocuments\AOI 10 SCR\Appendix A-1 - Historic Use and Current Use\_6-13-11.mxd



## **APPENDIX B**

Notice of Intent to Remediate and Report Notifications



## **NIR AND ASSOCIATED NOTICES**





**Sunoco Inc.**  
3144 Passyunk Avenue  
Philadelphia PA 19145-5299  
215 339 2000

October 12, 2006

Mr. Robert Day-Lewis  
Pennsylvania DEP  
2 East Main Street  
Norristown, PA 19401

Mr. Steve O'Neil  
Pennsylvania DEP  
2 East Main Street  
Norristown, PA 19401

Re: Sunoco Inc. (R&M) Philadelphia Refinery  
Philadelphia, Philadelphia County

Dear Mr. Day-Lewis and Mr. O'Neil:

In accordance with the Land Recycling and Environmental Remediation Standards Act (Act 2), enclosed are two copies of a Notice of Intent to Remediate (NIR) for the Sunoco Inc. (R&M) Philadelphia Refinery. This NIR covers remediation being done as part of the 2003 Consent Order and Agreement (CO&A) at Point Breeze, Girard Point and Schuylkill River Tank Farm. Remediation at Belmont Terminal, which is part of the CO&A, is not part of this NIR since this site is not subject to RCRA Corrective Action. Sunoco is considering submitting a separate NIR for this area under the Act 2 program only.

This NIR is being submitted with the intent to enter the Sunoco Philadelphia Refinery into the One Cleanup Program with PaDEP and the USEPA. All remediation work at the Philadelphia refinery will be completed under the 2003 Consent Order & Agreement (CO&A), however, RCRA Corrective Action measures will be addressed concurrently with work performed under the CO&A and within the Act 2 program.



September 21, 2006

Page 2

Please call me at 610-859-1881 or email me at [jroppenheim@sunocoinc.com](mailto:jroppenheim@sunocoinc.com) with any questions or comments.

Best Regards,

A handwritten signature in black ink, appearing to read 'James Oppenheim', with a long horizontal stroke extending to the right.

James Oppenheim, PE  
Sr. Environmental Consultant

Cc: Sunoco Legal Dept.  
Philadelphia Refinery Environmental Central File  
David Burke, PADEP  
Walter Payne, PADEP  
Hon Lee, USEPA Region III  
Colleen Costello, Langan



Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.

Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

|                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|
| <b>Remediator</b>                                                                                                |
| Contact Person: James R. Oppenheim                                                                               |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Remediation Project Manager |
| Phone Number: (610) 859-1881                                                                                     |
| Company Name: Sunoco, Inc. (R&M)                                                                                 |
| Address (street, city, state, zip): 100 Green St., Marcus Hook, PA 19061                                         |
| Email Address: jroppenheim@sunocoinc.com                                                                         |
| <b>Property Owner</b>                                                                                            |
| Contact Person: Scott Baker                                                                                      |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Environmental Manager       |
| Phone Number: (215) 339-2074                                                                                     |
| Company Name: Sunoco, Inc. (R&M)                                                                                 |
| Address (street, city, state, zip): 3144 Passyunk Ave. Philadelphia, PA 19145                                    |
| Email Address: sabaker@sunocoinc.com                                                                             |
| <b>Consultant</b>                                                                                                |
| Contact Person: Colleen Costello                                                                                 |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Consultant                  |
| Phone Number: (215) 864-0640                                                                                     |
| Company Name: Langan Engineering and Environmental Services                                                      |
| Address (street, city, state, zip): 30 South 17th St., Suite 1500, Philadelphia, PA 19103                        |
| Email Address: ccostello@langan.com                                                                              |

**Preparer of Notice of Intent to Remediate:**

Name: James Oppenheim  
 Address: 100 Green Street  
 Marcus Hook, PA 19061  
 Email Address: jroppenheim@sunocoinc.com

Title: Project Manager  
 Telephone: (610) 859-1881

Email Image File of Site Map showing property lines and general area of site(s) to be remediated to:  
 (landrecycling@state.pa.us)





October 12, 2006

**Sunoco Inc.**  
3144 Passyunk Avenue  
Philadelphia PA 19145-5299  
215 339 2000

Manager  
Philadelphia Department of Public Health  
Environmental Health Services  
321 University Avenue  
Philadelphia, PA 19104

Re: Sunoco, Inc. (R&M) Philadelphia Refinery  
Philadelphia, Philadelphia County

Dear Sir/Madam:

The Land Recycling and Environmental Remediation Standards Act (Act 2) requires that a Notice of Intent to Remediate (NIR) be provided to the municipality in which the site is located when a site is being remediated to a site-specific Standard. The municipality is afforded a 30-day comment period. In accordance with this provision of the Act, Sunoco, Inc. (R&M) is formally notifying you of its intent to remediate the subject site under Act 2. A copy of the NIR, which will be sent to the Pennsylvania Department of Environmental Protection (PaDEP), is enclosed. This notice will also be published in the Pennsylvania Bulletin, and a summary of the notice appeared in the Philadelphia Daily News on October 16, 2006.

Publication of this notice in the Philadelphia Daily News initiates the 30-day public and municipal comment period. During the next thirty days, your municipality may request to become involved in the development of the remediation plans for the site. If the municipality wishes to become involved in this project, please send your comments to Sunoco to my attention.

Please call me at (610) 859-1881 if you have any questions concerning the proposed remediation.

Best Regards,

A handwritten signature in black ink, appearing to read "James R. Oppenheim". The signature is fluid and cursive, with a large loop at the end.

James R. Oppenheim, P.E.  
Senior Environmental Consultant



**Cc: Sunoco Legal Dept.  
Philadelphia Refinery Environmental Central File  
Steve O'Neil, PaDEP  
Colleen Costello, Langan**



Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.

Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

|                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|
| <b>Remediator</b>                                                                                                |
| Contact Person: James R. Oppenheim                                                                               |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Remediation Project Manager |
| Phone Number: (610) 859-1881                                                                                     |
| Company Name: Sunoco, Inc. (R&M)                                                                                 |
| Address (street, city, state, zip): 100 Green St., Marcus Hook, PA 19061                                         |
| Email Address: jroppenheim@sunocoinc.com                                                                         |
| <b>Property Owner</b>                                                                                            |
| Contact Person: Scott Baker                                                                                      |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Environmental Manager       |
| Phone Number: (215) 339-2074                                                                                     |
| Company Name: Sunoco, Inc. (R&M)                                                                                 |
| Address (street, city, state, zip): 3144 Passyunk Ave. Philadelphia, PA 19145                                    |
| Email Address: sabaker@sunocoinc.com                                                                             |
| <b>Consultant</b>                                                                                                |
| Contact Person: Colleen Costello                                                                                 |
| Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Consultant                  |
| Phone Number: (215) 864-0640                                                                                     |
| Company Name: Langan Engineering and Environmental Services                                                      |
| Address (street, city, state, zip): 30 South 17th St., Suite 1500, Philadelphia, PA 19103                        |
| Email Address: ccostello@langan.com                                                                              |

**Preparer of Notice of Intent to Remediate:**

Name: James Oppenheim

Title: Project Manager

Address: 100 Green Street

Telephone: (610) 859-1881

Marcus Hook, PA 19061

Email Address: jroppenheim@sunocoinc.com

Email Image File of Site Map showing property lines and general area of site(s) to be remediated to:  
(landrecycling@state.pa.us)



**Proof of Publication in The Philadelphia Daily News  
Under Act. No 587, Approved May 16, 1929**

**STATE OF PENNSYLVANIA  
COUNTY OF PHILADELPHIA**

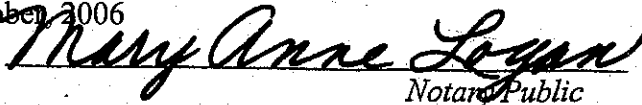
Anna Dickerson being duly sworn, deposes and says that **The Philadelphia Daily News** is a newspaper published daily, except Sunday, at Philadelphia, Pennsylvania, and was established in said city in 1925, since which date said newspaper has been regularly issued in said County, and that a copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said newspaper on the following dates:

October 16, 2006

Affiant further deposes and says that he is an employee of the publisher of said newspaper and has been authorized to verify the foregoing statement and that he is not interested in the subject matter of the aforesaid notice of publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.



Sworn to and subscribed before me this 16th day of  
October 2006

  
Notary Public

My Commission Expires:

NOTARIAL SEAL  
Mary Anne Logan, Notary Public  
City of Philadelphia, Phila. County  
My Commission Expires March 30, 2009

**Copy of Notice of Publication**

**Newspaper Notice of Intent to Remediate  
to an Environmental Standard  
(Sections 302(a)(1)(ii), 303(b)(1)(ii),  
304(n)(1)(i), and 305(c)(1))**

Pursuant to the Land Recycling and Environmental Remediation Standards Act (Act), the act of May 19, 1995, P.L. 4, No. 1995-2, notice is hereby given that Sunoco Inc. (R&M) has submitted to the Pennsylvania Department of Environmental Protection a Notice of Intent to Remediate a site located at 3144 Passunk Ave., Philadelphia, Philadelphia County, Pennsylvania. This Notice of Intent to Remediate states that the site is a petroleum refinery. It has been determined that petroleum compounds have impacted soil and groundwater at the site. Sunoco Inc. (R&M) has indicated that proposed remediation measures will include source reduction and engineered boundary controls. The proposed future use of the property is industrial for continued operation as a petroleum refinery.

Sunoco Inc. (R&M) plans to use the site-specific remediation standard at the site. The Act provides for a 30-day public comment period for site-specific standard remediation. The 30-day comment period is initiated with the publication of this notice. Until November 16, 2006, the City of Philadelphia may submit a request to Sunoco Inc. (R&M) to be involved in the development of the remediation and reuse plans for the site. The City of Philadelphia may also submit a request to Sunoco Inc. (R&M) during this 30-day comment period to develop and implement a public involvement plan. Copies of these requests and of any comments should also be submitted to the Department of Environmental Protection at 2 East Main Street, Norristown, PA 19401 to the attention of Mr. Walter Payne. All correspondence with Sunoco Inc. (R&M) should be addressed to the Public Relations Dept., Sunoco Inc. (R&M) at 3144 Passunk Ave., Philadelphia, PA, 19145.



## LEGAL NOTICES

Newspaper Notice of Intent to Remediate  
to an Environmental Standard.  
(Sections 302(e)(1)(ii), 303(h)(1)(ii),  
304(n)(1)(i), and 305(c)(1))

Pursuant to the Land Recycling and Environmental Remediation Standards Act (Act), the act of May 19, 1995, P.L. 4, No. 1995-2., notice is hereby given that Sunoco Inc.(R&M) has submitted to the Pennsylvania Department of Environmental Protection a Notice of Intent to Remediate a site located at 3144 Passyunk Ave., Philadelphia, Philadelphia County, Pennsylvania. This Notice of Intent to Remediate states that the site is a petroleum refinery. It has been determined that petroleum compounds have impacted soil and groundwater at the site. Sunoco Inc. (R&M) has indicated that proposed remediation measures will include source reduction and engineered boundary controls. The proposed future use of the property is industrial for continued operation as a petroleum refinery.

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Appeared in: **Philadelphia Inquirer & Philadelphia Daily News** on Monday, 10/16/2006

[Back](#)

## **SCR/RIR NOTICES**





June 1, 2011

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Manager  
Philadelphia Department of Public Health  
Environmental Health Services  
321 University Avenue  
Philadelphia, Pennsylvania 19104

**RE: Notice of Submittal of Site Characterization/  
Remedial Investigation Report  
Area of Interest (AOI) 10  
Sunoco, Inc. (R&M) Philadelphia Refinery  
Philadelphia, Philadelphia County, Pennsylvania  
Langan Project No.: 2574601**

Dear Sir/Madam:

Notice is hereby given that Sunoco, Inc. (R&M) (Sunoco) is in the process of submitting a Site Characterization/Remedial Investigation Report to the Pennsylvania Department of Environmental Protection for AOI 10 located at the Sunoco Philadelphia Refinery, Philadelphia, Philadelphia County, Pennsylvania. The report indicates that the remediation planned will attain compliance with a combination of site-specific and the statewide health cleanup standards.

This notice is made under the provision of the Land Recycling and Environmental Standards Act, the Act of May 19, 1995, P.L. #4, No. 2.

Sincerely,  
**Langan Engineering and Environmental Services, Inc.**

Colleen Costello, P.G.  
Senior Principal

cc: Jim Oppenheim, Sunoco  
Kevin Dunleavy, Sunoco

David T. Gockel, P.E., P.P.  
George P. Kelley, P.E.  
George E. Derrick, P.E.  
Michael A. Semeraro, Jr., P.E.  
Nicholas De Rose, P.G.  
Andrew J. Ciancia, P.E.  
George E. Leventis, P.E.  
Rudolph P. Frizzi, P.E., G.E.  
Ronald A. Fuerst, C.L.A.  
Colleen Costello, P.G.  
Cristina M. González, P.E.  
Gerald J. Zambrella, C.E.M.  
Gregory M. Elko, P.E.  
Steven Ueland, P.E.

Caryn L. Barnes  
Gerard M. Coscia, P.E.  
Jason S. Engelhardt, P.E.  
Edward H. Geibert, M.S.  
Christopher M. Hager, P.E.  
John J. McElroy, Jr., Ph.D., P.E.  
Michael D. Szura, C.L.A., A.S.L.A.  
Stewart H. Abrams, P.E.  
Brian M. Conlon, P.E.  
Jeffrey A. Smith, P.G.

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Sent To  
 Manager  
 Philadelphia Dept. of Public Health  
 Environmental Health Services  
 321 University Avenue  
 Philadelphia, Pennsylvania 19104

PS Form 3800, August 2006

See Reverse for Instructions

**SENDER: COMPLETE THIS SECTION**

- Complete Items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X *Dawn Bolloway* ☒ Agent ☐ Addressee

B. Received by (Printed Name)

C. Date of Delivery

6/3/11

D. Is delivery address different from item 1?

☐ Yes

If YES, enter delivery address below:

☒ No



**Proof of Publication in The Philadelphia Daily News  
Under Act. No 587, Approved May 16, 1929**

**STATE OF PENNSYLVANIA  
COUNTY OF PHILADELPHIA**

Anna Dickerson being duly sworn, deposes and says that **The Philadelphia Daily News** is a newspaper published daily, except Sunday, at Philadelphia, Pennsylvania, and was established in said city in 1925, since which date said newspaper has been regularly issued in said County, and that a copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said newspaper on the following dates:

June 13, 2011

Affiant further deposes and says that she is an employee of the publisher of said newspaper and has been authorized to verify the foregoing statement and that she is not interested in the subject matter of the aforesaid notice of publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.



Sworn to and subscribed before me this 13<sup>th</sup> day of  
June, 2011

  
Notary Public

My Commission Expires:

NOTARIAL SEAL  
Mary Anne Logan, Notary Public  
City of Philadelphia, Phila. County  
My Commission Expires March 30, 2013

Copy of Notice of Publication

**Notification of  
Receipt of Site  
Characterization/  
Remedial  
Investigation Report**  
Notice is hereby given  
that Sunoco Inc.  
(R&M) (Sunoco) is in  
the process of sub-  
mitting a Site  
Characterization/ Re-  
medial Investigation  
Report to the Penn-  
sylvania Department  
of Environmental Pro-  
tection (PADEP),  
Southeast Regional  
Office for Area of In-  
terest (AOI 10) located  
at the Sunoco Phila-  
delphia Refinery, Phila-  
delphia, Pennsylvan-  
ia. Sunoco has indi-  
cated in the report  
that site characteriza-  
tion activities have  
been completed at  
AOI 10 in accordance  
with the Land Recy-  
cling and Environmen-  
tal Remediation  
Standards Act and  
the 2004 Memorand-  
um of Agreement  
between the PADEP  
and U.S. Environmen-  
tal Protection Agency  
(EPA) (a.k.a., the PA  
One Cleanup Pro-  
gram). This notice is  
made under the provi-  
sion of the Land Re-  
cycling and Environ-  
mental Remediation  
Standards Act, the  
Act of May 19, 1995,  
P.L. #4, No. 2.

## **APPENDIX C**

Soil Boring Logs and Monitoring Well  
Construction Summaries





# MONITORING WELL LOG: W-1D

|                |                              |                        |                         |
|----------------|------------------------------|------------------------|-------------------------|
| PROJECT:       | Sunoco-Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff           |
| SITE LOCATION: | AOI-10                       | DRILLING METHOD:       | Hollow Stem Auger       |
| JOB NO.:       |                              | SAMPLING METHOD:       | 4' Acetate Sleeves & SS |
| LOGGED BY:     | Tiffani Doerr                | SCREEN/RISER DIAMETER: | 4-inch                  |
| DATES DRILLED: | 4/5/11-4/6/11                | WELLBORE DIAMETER:     | 6.25"                   |
| TOTAL DEPTH:   | 76.5'                        | ELEVATION:             | NA                      |

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                                                                                 | COMMENTS                                                                        | WELL<br>CONSTRUCTION    | WELL<br>DIAGRAM |
|-----------------|--------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------|-----------------|
| 0.0             |              |      | 1' topsoil beneath grass.                                                                                                                                                 | Core samples from surface to depth using acetate sleeves; no utility clearance. |                         |                 |
| 0.0             |              |      | FILL: medium brown and orange fine sand w/clay; whole brick 1.5'-2'. No odors.                                                                                            | 0'-2' Sample submitted to laboratory for analysis                               |                         |                 |
| 0.0             |              |      | (BC=47/2'-4-8-16-24) Same as above to 5.5'. Fill: Dark gray/black cinders and sand, very little fines, with some brick and concrete pieces. Odors.                        |                                                                                 |                         |                 |
| -5.0            |              |      | (BC=5-6-3-3-3-3-2) Fill: saturated cinders, sand, loose, petroleum globules on water. Sheen. Odors.                                                                       |                                                                                 |                         |                 |
| -10.0           |              |      | (BC=2-3-2-1-2-1-1-1) 6" Recovery: m-c light brown SAND.                                                                                                                   |                                                                                 | Grout slurry (0'-57.5') |                 |
| -15.0           |              |      | (BC=2-2-2-2-2-3-2-2) 16'-17' mix of loose saturated sands and light gray clay. 17'-20' light gray CLAY; trace round gravel near 17', rest clay has 5% organics (grasses). |                                                                                 |                         |                 |
| -20.0           |              |      | (BC=WOH/1'-2-0-2-2-2-2) Same w/ ~15% organic material.                                                                                                                    |                                                                                 |                         |                 |



# MONITORING WELL LOG: W-1D

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                               | COMMENTS | WELL<br>CONSTRUCTION | WELL<br>DIAGRAM |
|-----------------|--------------|------|---------------------------------------------------------------------------------------------------------|----------|----------------------|-----------------|
| 0.0             |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      | (BC=WOH/2'-1-1-1-1) Same: sl micaceous, no odors.                                                       |          |                      |                 |
| -25 0.0         |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      | (BC=WOH/2') Split Spoon: Same: light gray clay, sl micaceous some organics.                             |          |                      |                 |
| -30 0.0         |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      | (BC=WOH/2'-3-2-2-3) Same: trace round gravel, 10% organics; trace layers of very fine light gray sands. |          |                      |                 |
|                 |              |      |                                                                                                         |          |                      |                 |
|                 |              |      |                                                                                                         |          |                      |                 |
| -35 0.0         |              |      | (BC=WOH/2'-1-1-1-1) Same: no gravel, trace organics, trace fine sands.                                  |          |                      |                 |
| 0.0             |              |      |                                                                                                         |          |                      |                 |
|                 |              |      |                                                                                                         |          |                      |                 |
|                 |              |      | (BC=WOH/2') Same as above.                                                                              |          |                      |                 |
| -40 0.0         |              |      | (BC=WOH/3'2-2) Same as above.                                                                           |          |                      |                 |
| 0.0             |              |      |                                                                                                         |          |                      |                 |
|                 |              |      |                                                                                                         |          |                      |                 |
|                 |              |      | (BC=WOH/2'-3-3-3-3) Same as above.                                                                      |          |                      |                 |
| -45 0.0         |              |      |                                                                                                         |          |                      |                 |
| 0.0             |              |      |                                                                                                         |          |                      |                 |
|                 |              |      |                                                                                                         |          |                      |                 |
|                 |              |      | (BC=WOH-3-3-5) Split Spoon: same as above.                                                              |          |                      |                 |







# MONITORING WELL LOG: W-28

|                |                                |                        |                     |
|----------------|--------------------------------|------------------------|---------------------|
| PROJECT:       | Sunoco - Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff, Inc. |
| SITE LOCATION: | AOI-10                         | DRILLING METHOD:       | Hollow Stem Auger   |
| JOB NO.:       |                                | SAMPLING METHOD:       | Acetate Sleeves     |
| LOGGED BY:     | Tiffani Doerr                  | SCREEN/RISER DIAMETER: | 4"                  |
| DATES DRILLED: | 4/18/11                        | WELLBORE DIAMETER:     | 8"                  |
| TOTAL DEPTH:   | 14'                            | ELEVATION:             |                     |

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                         | COMMENTS                                        | WELL<br>CONSTRUCTION                                                            | WELL<br>DIAGRAM |
|-----------------|--------------|------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------|-----------------|
| 0               |              |      | [0-4'] (BC=4-4-7-8-3-4-3-3) 1'<br>Recovery - Gravel, f/c sand and<br>gravel, tan/gray, wet, some<br>wood material | Sample taken 0-2'<br>for laboratory<br>analysis | Grout 0-2'<br>4" PVC - Stick Up 2'<br><br>4" PVC - Riser 0-4'<br>Bentonite 2-3' |                 |
| 2.3             |              |      |                                                                                                                   |                                                 |                                                                                 |                 |
| 8.4             |              |      | [4-8'] (BC=1-1-1-7-1-1-2-2) 1'<br>Recovery - Black fine sand w/<br>some clay, wet, strong odor                    |                                                 |                                                                                 |                 |
| -5              |              |      |                                                                                                                   |                                                 | Sand 3-14'                                                                      |                 |
| 26.6            |              |      |                                                                                                                   |                                                 |                                                                                 |                 |
| 349             |              |      |                                                                                                                   |                                                 |                                                                                 |                 |
| 968             |              |      | [8-10'] (BC=WOH-WOH-10-4)<br>Black f/c sand w/ some gray<br>clay, wet, strong odor, visible<br>sheen/product      |                                                 | 4" PVC - Screen 4-<br>14'                                                       |                 |
| 363             |              |      |                                                                                                                   |                                                 |                                                                                 |                 |
| -10             |              |      | [10-14'] (BC=WOH/4') Little (4")<br>Recovery - Gray fine sandy<br>clay, wet, strong odor                          |                                                 |                                                                                 |                 |
| 372             |              |      |                                                                                                                   | Well Complete to<br>14'                         |                                                                                 |                 |





# MONITORING WELL LOG: W-29

Page 1 of 1

|                |                                |                        |                     |
|----------------|--------------------------------|------------------------|---------------------|
| PROJECT:       | Sunoco - Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff, Inc. |
| SITE LOCATION: | AOI-10                         | DRILLING METHOD:       | Hollow Stem Auger   |
| JOB NO.:       |                                | SAMPLING METHOD:       | Acetate Sleeves     |
| LOGGED BY:     | Tiffani Doerr                  | SCREEN/RISER DIAMETER: | 4"                  |
| DATES DRILLED: | 4/18/11                        | WELLBORE DIAMETER:     | 8"                  |
| TOTAL DEPTH:   | 14'                            | ELEVATION:             |                     |

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                                                                                                     | COMMENTS                                        | WELL<br>CONSTRUCTION                  | WELL<br>DIAGRAM |
|-----------------|--------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------|-----------------|
| 0.0             |              |      | [0-4'] (BC=5-16-16-9-10-7-7-5)<br>Full Recovery - 0-2' - Grass,<br>black/dk. brown sandy silt and<br>gravels, dry, no odors                                                                   | Sample taken 0-2'<br>for laboratory<br>analysis | Grout 0-2'<br>4" PVC - Stick Up 2'    |                 |
| 0.0             |              |      | [4-8'] (BC=6-11-7-5-7-6-10-6) 3'<br>Recovery - Top 2' - Same as<br>above, black sand/silt w/ brick<br>and cinders, dry, no odor;<br>Bottom 1' - Wet, black gravel w/<br>f/c sand, slight odor |                                                 | 4" PVC - Riser 0-4'<br>Bentonite 2-3' |                 |
| -5              |              |      |                                                                                                                                                                                               |                                                 | Sand 3-14'                            |                 |
| 0.0             |              |      |                                                                                                                                                                                               |                                                 |                                       |                 |
| 0.2             |              |      |                                                                                                                                                                                               |                                                 |                                       |                 |
| 15.9            |              |      | [8-10'] (BC=1-2-4-4) 6"<br>Recovery - Same as above                                                                                                                                           |                                                 | 4" PVC - Screen 4-<br>14'             |                 |
| -10             | 7.5          |      | [10-14'] (BC=2-2-5-3-3-2-2-2)<br>No Recovery                                                                                                                                                  |                                                 |                                       |                 |
|                 |              |      |                                                                                                                                                                                               | Well Complete to<br>14'                         |                                       |                 |



# MONITORING WELL LOG: W-30

Page 1 of 1

|                |                                |                        |                     |
|----------------|--------------------------------|------------------------|---------------------|
| PROJECT:       | Sunoco - Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff, Inc. |
| SITE LOCATION: | AOI-10                         | DRILLING METHOD:       | Hollow Stem Auger   |
| JOB NO.:       |                                | SAMPLING METHOD:       | Acetate Sleeves     |
| LOGGED BY:     | Tiffani Doerr                  | SCREEN/RISER DIAMETER: | 4"                  |
| DATES DRILLED: | 4/15/11                        | WELLBORE DIAMETER:     | 8"                  |
| TOTAL DEPTH:   | 13'                            | ELEVATION:             |                     |

| Depth (feet) | OVM (ppm) | USCS | LITHOLOGY                                                                                                                                                                               | COMMENTS                                  | WELL CONSTRUCTION                                                           | WELL DIAGRAM |
|--------------|-----------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------|--------------|
| 0            |           |      | [0-4'] (BC=1-5-6-6-7-7-5-2) 3' Recovery - Slightly moist fine sand, alternating layes of black/medium brown and tan, 2" of soil at top (grass,roots, orange/brown)                      | Sample taken 0-2' for laboratory analysis | Grout 0-1'<br>4" PVC - Stick Up 2'<br>Bentonite 1-2'<br>4" PVC - Riser 0-3' |              |
| 1.3          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
| 1.2          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
| 1.3          |           |      | [4-8'] (BC=3-2-2-4-4-4-4-2) 3' Recovery - Same as above to 6'; 6'-8' - Wet, black fine sand, very slight odor                                                                           |                                           |                                                                             |              |
| -5 1.0       |           |      |                                                                                                                                                                                         |                                           | Sand 2-13'                                                                  |              |
| 0.9          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
| 0.9          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
| 1.1          |           |      | [8-10'] (BC=2-3-3-3) Top 1' - Wet, brown/black f/c sand and f/c gravel; 9-10' - Wet sand and f. gravel fill - small brown round "nuggets" and pumice-like material, slight sheen, loose |                                           | 4" PVC - Screen 3-13'                                                       |              |
| 1.8          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
| -10          |           |      | [10-14'] 2' Recovery - Same as above to 13' mixed w/ gray clay; 13-14' - Gray clay                                                                                                      |                                           |                                                                             |              |
| 2.5          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |
|              |           |      |                                                                                                                                                                                         | Well Complete to 13'                      |                                                                             |              |
| 1.5          |           |      |                                                                                                                                                                                         |                                           |                                                                             |              |





# MONITORING WELL LOG: W-31

Page 1 of 1

|                |                                |                        |                     |
|----------------|--------------------------------|------------------------|---------------------|
| PROJECT:       | Sunoco - Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff, Inc. |
| SITE LOCATION: | AOI-10                         | DRILLING METHOD:       | Hollow Stem Auger   |
| JOB NO.:       |                                | SAMPLING METHOD:       | Acetate Sleeves     |
| LOGGED BY:     | Tiffani Doerr                  | SCREEN/RISER DIAMETER: | 4"                  |
| DATES DRILLED: | 4/15/11                        | WELLBORE DIAMETER:     | 8"                  |
| TOTAL DEPTH:   | 15'                            | ELEVATION:             |                     |

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                                                                                                    | COMMENTS                                  | WELL<br>CONSTRUCTION                                                        | WELL<br>DIAGRAM |
|-----------------|--------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------|-----------------|
| 0               |              |      | [0-4'] (BC=10-9-14-6-4-4-4-4) - 2.5' Recovery (fill) - Top 12" - Med. brown coarse sand w/ gravel, few clays, moist, sl. odors; 1-4' - Black, strong odors, fine sand and silt like material | Sample taken 0-2' for laboratory analysis | Grout 0-1'<br>4" PVC - Stick Up 2'<br>Bentonite 1-2'<br>4" PVC - Riser 0-3' |                 |
| 1.3             |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| 1.0             |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| 16.1            |              |      | [4-8'] (BC=1-1-2-1-1-3-4-3) - 2' Recovery - Top 1' - Wet, black sand w/ fine gravel; Bottom 1' - Black, v. moist fine sand and silt                                                          |                                           | Sand 2-15'                                                                  |                 |
| -5              |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| 100             |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| 103             |              |      | [8-10'] (BC=2-1-WOH-WOH) - Top 1' - Fill, black clayey sand w/ few fine round gravel & large gravel, slag; Bottom 1' - Lt. brown-gray clay (native)                                          |                                           | 4" PVC - Screen 3-15'                                                       |                 |
| 88.6            |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| -10             |              |      | [10-14'] (BC=WOH-WOH-WOH-WOH-2-2-4-4) - 8" Recovery - Same as above                                                                                                                          |                                           |                                                                             |                 |
| 35.7            |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| 54.4            |              |      |                                                                                                                                                                                              |                                           |                                                                             |                 |
| -15             |              |      |                                                                                                                                                                                              | Well Complete to 15'                      |                                                                             |                 |



# MONITORING WELL LOG: W-32

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.:

Parratt Wolff, Inc.

SITE LOCATION: AOI-10

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Acetate Sleeves

LOGGED BY: Tiffani Doerr

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 4/18/11

WELLBORE DIAMETER:

8"

TOTAL DEPTH: 13'

ELEVATION:

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                               | COMMENTS             | WELL<br>CONSTRUCTION                                                        | WELL<br>DIAGRAM |
|-----------------|--------------|------|---------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------|-----------------|
| 0               |              |      |                                                                                                         |                      | Grout 0-1'<br>4" PVC - Stick Up 2'<br>Bentonite 1-2'<br>4" PVC - Riser 0-3' |                 |
| -5              |              |      | Well installed directly next to W-32D (see W-32D log for lithology), Sample collected from 0-2' @ W-32D |                      | Sand 2-13'                                                                  |                 |
| -10             |              |      |                                                                                                         |                      | 4" PVC - Screen 3-13'                                                       |                 |
|                 |              |      |                                                                                                         | Well Complete to 13' |                                                                             |                 |





# MONITORING WELL LOG: W-32D

|                |                              |                        |                         |
|----------------|------------------------------|------------------------|-------------------------|
| PROJECT:       | Sunoco-Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff           |
| SITE LOCATION: | AOI-10                       | DRILLING METHOD:       | Hollow Stem Auger       |
| JOB NO.:       |                              | SAMPLING METHOD:       | 4' Acetate Sleeves & SS |
| LOGGED BY:     | Tiffani Doerr                | SCREEN/RISER DIAMETER: | 4-inch                  |
| DATES DRILLED: | 4/7/11-4/8/11                | WELLBORE DIAMETER:     | 6.25"                   |
| TOTAL DEPTH:   | 53'                          | ELEVATION:             | NA                      |

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                                                                                                | COMMENTS                                                                                    | WELL<br>CONSTRUCTION  | WELL<br>DIAGRAM |
|-----------------|--------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------|-----------------|
| 0.0             |              |      | 8" topsoil - wooded area<br>(BC=1-13-12-13-14-6-5-6) FILL:<br>medium brown sl moist sand w/<br>little clay and gravel and slag<br>material.                                              | Core samples from<br>surface to depth<br>using acetate<br>sleeves; no utility<br>clearance. |                       |                 |
| 0.0             |              |      | (BC=3-4-3-3-2-3-2-2) Fill: Med<br>brown sl moist clayey sandy soil<br>w/lg piece of asphalt in tip                                                                                       | 0'-2' Sample<br>submitted to<br>laboratory for<br>analysis                                  |                       |                 |
| -5<br>0.3       |              |      | (BC=5-11-6-7) Split Spoon:<br>WASTE: (8'-9') Wet, loose,<br>black sandy oily sludge material<br>(not platy). (9'-10') Wood, dk<br>gray/blk clayey sand w/rock<br>frags, oily/wet at 10'. |                                                                                             |                       |                 |
| -10<br>34       |              |      | (BC=3-5-6-2-2-2-2-5) (10'-14')<br>Brick frags and black oily slag<br>material.                                                                                                           |                                                                                             |                       |                 |
| -15<br>71.7     |              |      | (BC=1-1-2-2-3-4-3-3) Clayey<br>sand w/round gravel; pottery<br>piece, oily.                                                                                                              |                                                                                             | Grout slurry (0'-47') |                 |
| -20<br>39.5     |              |      | (BC=5-11-10-4) Split spoon:<br>Same as above.                                                                                                                                            |                                                                                             |                       |                 |
| -20<br>83.6     |              |      | (BC=4-2-2-3-3-3-5-5) Top 2"<br>same. Rest: dark gray CLAY<br>5% organics, moist.                                                                                                         |                                                                                             |                       |                 |
| -20<br>27.6     |              |      |                                                                                                                                                                                          |                                                                                             |                       |                 |
| -20<br>104      |              |      |                                                                                                                                                                                          |                                                                                             |                       |                 |
| -20<br>267      |              |      |                                                                                                                                                                                          |                                                                                             |                       |                 |



# MONITORING WELL LOG: W-32D

| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                        | COMMENTS | WELL<br>CONSTRUCTION | WELL<br>DIAGRAM |
|-----------------|--------------|------|--------------------------------------------------------------------------------------------------|----------|----------------------|-----------------|
| 11.4            |              |      | (BC=2-2-2-WOH-2-2-3-2) Same clay with 10% organics (grasses), wet.                               |          |                      |                 |
| -25             |              |      |                                                                                                  |          |                      |                 |
| 5.4             |              |      |                                                                                                  |          |                      |                 |
| 6.7             |              |      | (BC=WOH-WOH-2-2) Split spoon: Same w/loose graveley clay at 28-28.5'.                            |          |                      |                 |
| -30             |              |      |                                                                                                  |          |                      |                 |
| 4.9             |              |      | (BC=WOH/2'-1-2-4-3) Same: tight clay, gray/brown organic material, moist.                        |          |                      |                 |
| 3.9             |              |      |                                                                                                  |          |                      |                 |
| 2.8             |              |      | (BC=2-3-WOH/1'-3-4-3-3) Same as above to 36' - then soft brown clay w/organics.                  |          |                      |                 |
| -35             |              |      |                                                                                                  |          |                      |                 |
| 4.9             |              |      |                                                                                                  |          |                      |                 |
| 5.7             |              |      | (BC=2-4-3-3) Split spoon. Same as above.                                                         |          |                      |                 |
| 5.6             |              |      |                                                                                                  |          | Bentonite (37'-40')  |                 |
| -40             |              |      |                                                                                                  |          |                      |                 |
| 2.5             |              |      | (BC=3-3-2-1-2-4-2-3) Same as above to 42', then gray clay, tight, sl micaceous, trace fine sand. |          | Sand (40'-53')       |                 |
| 4.6             |              |      |                                                                                                  |          |                      |                 |
| 4.4             |              |      | (BC=3-2-3-2-4-2-3-3) No recovery.                                                                |          |                      |                 |
| -45             |              |      |                                                                                                  |          |                      |                 |
|                 |              |      |                                                                                                  |          | Screen (43'-53')     |                 |
| 2.1             |              |      | (BC=2-1-2-1) Split spoon: Gray clay, wet, loose w/trace fine sand.                               |          |                      |                 |





# MONITORING WELL LOG: W-32D

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| Depth (feet) | OVM (ppm) | USCS | LITHOLOGY                                                                                                                                        | COMMENTS | WELL CONSTRUCTION | WELL DIAGRAM |
|--------------|-----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------|--------------|
| -50          | 1.8       |      | (BC=WOH/2'-WOH-3-3-3)<br>Same to 52', from 52'-54' has 30% brown organic material.                                                               |          |                   |              |
|              | 2.0       |      | Spin augers to 54' (where last spoon ended) - @54' felt and heard sound of gravel in teeth of auger. High pressure gas/water emerging from well. |          |                   |              |
|              | 1.6       |      | Sand and sm gravel coming up with water, then mica flakes (black and white) up to 1cm coming up with water.                                      |          |                   |              |
| -55          |           |      |                                                                                                                                                  |          |                   |              |

Spin augers to 54' (where last spoon ended) - @54' felt and heard sound of gravel in teeth of auger. Immediately upon hitting gravel, water came up from hole at high pressure - exiting augers from bolt holes in side and shooting ~20' in either direction. Stop work. By end of day, water lessened but gas still at high pressure. After 2 days gas seemed to stop - (4/11/11) drive head was removed from augers - however, when drillers pulled slightly on the rods which were left down the hole, water initially shot up to top of mast and continued as artesian (1'-3' above top of augers) (must have plugged itself up over weekend). On 4/12/11 water only ~6" above top of augers and not constant. On 4-13-11: readings at well head: Methane 23.5%, CO2 2.7%, O2 14.2%, LEL 100%, H2S 0.0, PID 0.0ppm. On 4/14/11 and 4/15/11: water no longer coming up out of augers, but can be heard gurgling down the hole and obvious gas still emerging from borehole. On 4/18/11: LEL low outside well head - augers are pulled and well casing set - no cap put on well to allow for venting of vapors (vapors can still be seen emerging from casing during sampling on 4/27/11).



# MONITORING WELL LOG: W-33

Page 1 of 1

|                |                                |                        |                     |
|----------------|--------------------------------|------------------------|---------------------|
| PROJECT:       | Sunoco - Philadelphia Refinery | DRILLING CO.:          | Parratt Wolff, Inc. |
| SITE LOCATION: | AOI-10                         | DRILLING METHOD:       | Hollow Stem Auger   |
| JOB NO.:       |                                | SAMPLING METHOD:       | Acetate Sleeves     |
| LOGGED BY:     | Shaun Sykes                    | SCREEN/RISER DIAMETER: | 4"                  |
| DATES DRILLED: | 4/20/11                        | WELLBORE DIAMETER:     | 8"                  |
| TOTAL DEPTH:   | 16'                            | ELEVATION:             |                     |

| Depth (feet) | OVM (ppm) | USCS | LITHOLOGY                                                                                         | COMMENTS                                  | WELL CONSTRUCTION                                                           | WELL DIAGRAM |
|--------------|-----------|------|---------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------|--------------|
| 0.0          |           |      | [0-4'] (BC=WOH-2-13-10-15-5-4-3) Grass/moss, brown sandy silt, gravel, brick fill, moist          | Sample taken 0-2' for laboratory analysis | Grout 0-4'<br>4" PVC - Stick Up 2'<br>Bentonite 4-5'<br>4" PVC - Riser 0-6' |              |
| -5.0         |           |      | [4-8'] (BC=WOH-3-3-1-3-3-8-4) Little Recovery - Brown, moist/loose f/c sand, little silt/clay     |                                           | Sand 5-16'                                                                  |              |
| -10.0        |           |      | [8-10'] (BC=5-6-36-14) 1' Recovery - Fill, wood and brick, some brown sandy/silty clay, moist/wet |                                           | 4" PVC - Screen 6-16'                                                       |              |
| -15.0        |           |      | [10-14'] (BC=2-5-5-3-1-4-5-13) 1' Recovery - Same as above with some sandy gray clay, wet         |                                           |                                                                             |              |
| -27.2        |           |      | [14-18'] (BC=WOH-2-12-12-47-21-14-12) 3' Recovery - Black, wet, f/c sand/gravel and clay          | Well Complete to 16'                      |                                                                             |              |
| -12.4        |           |      |                                                                                                   |                                           |                                                                             |              |



| Depth<br>(feet) | OVM<br>(ppm) | USCS | LITHOLOGY                                                                                                 | COMMENTS                                        | WELL<br>CONSTRUCTION                                                            | WELL<br>DIAGRAM |
|-----------------|--------------|------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------|-----------------|
| 0.0             |              |      | [0-4'] (BC=6-8-11-7-7-5-4)<br>Full Recovery - Grass,<br>brown/dk. brown sandy silt, little<br>gravel, dry | Sample taken 0-2'<br>for laboratory<br>analysis | Grout 0-2'<br>4" PVC - Stick Up 2'<br><br>Bentonite 2-3'<br>4" PVC - Riser 0-4' |                 |
| 0.0             |              |      |                                                                                                           |                                                 |                                                                                 |                 |
| 0.0             |              |      | [4-8'] (BC=5-3-3-3-5-9-20-10)<br>Litte (4") Recovery - Wet, dk.<br>brown sandy silt and gravel            |                                                 |                                                                                 |                 |
| -5              |              |      |                                                                                                           |                                                 | Sand 3-15'                                                                      |                 |
| 0.0             |              |      |                                                                                                           |                                                 |                                                                                 |                 |
|                 |              |      |                                                                                                           |                                                 |                                                                                 |                 |
|                 |              |      | [8-10'] (BC=13-10-10-5) No<br>Recovery - wet gravel                                                       |                                                 | 4" PVC - Screen 4-<br>14'                                                       |                 |
| -10             | 6.2          |      | [10-14'] (BC=4-5-14-22-30-9)<br>Full Recovery - Dk. brown/black<br>f/c sand and gravel w/ wood,<br>wet    |                                                 |                                                                                 |                 |
| 4.3             |              |      |                                                                                                           | Well Complete to<br>14'                         |                                                                                 |                 |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-36**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/5/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|--------------------------------------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Grass, dark brown sandy silt w/ oranic matter, few mixed gravels, sl. moist, no odor |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                                                      |                |          |
|                 |                                           | 0.0          | Mixed sand and gravels, trace dark brown silt, wet @ 2', no odor                     |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-37**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/5/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                             | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|---------------------------------------------------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Grass, dark brown sandy silt w/ oranic matter, sl. moist, no odor, increase sand and gravels @ 1' |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          | Mixed gravels, trace dark brown/black silt and sand, wet @ 1.5', no odor                          |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-38**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/5/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                               | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, dark brown sandy silt w/ organic matter to 0.5', coarse sand and mixed gravels, dry, no odor |                |          |
|                 |                                                       | 0.0          |                                                                                                     |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Coarse sand and mixed gravels, trace dk. brown silt, dry, no odor                                   |                |          |
|                 |                                                       | 0.0          |                                                                                                     |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-39**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/5/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                       | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|---------------------------------------------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Grass, dark brown sandy silt w/ organic matter and mixed gravels, wet @ 1', no odor         |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                                                             |                |          |
|                 |                                           | 386          | Black gravels and sand, trace black silt, strong odor, sheen on soil, wet, silt/clay @ 1.5' |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-40**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/5/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                   | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown sandy silt w/ organic matter, dry, no odor |                |          |
|                 |                                                       | 0.0          |                                                         |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Brown sandy silt, dry, no odor, trace clay              |                |          |
|                 |                                                       | 0.0          |                                                         |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-41**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/5/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                   | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown sandy silt w/ organic matter, dry, no odor |                |          |
|                 |                                                       | 0.0          |                                                         |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Tan/brown sandy silt, dry, no odor, some mixed gravels  |                |          |
|                 |                                                       | 0.0          |                                                         |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-42**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/19/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                             | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown silt to tan silt and gravels, moist  |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                                   |                |          |
|                 |                                                       | 0.0          | Dark brown/black sandy silt and gravels, wet @ 2' |                |          |





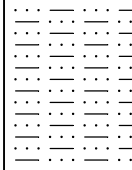
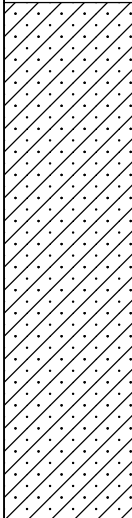
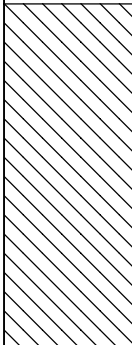
# SUBSURFACE BORING LOG

**BOREHOLE NO. BH-10-43**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeves  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                 | LITH-<br>OLOGY                                                                       | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          | [0-4'] (BC=WOH-6-7-4-2-3-6-5) 2' Recovery - Top 1' - Grass, brown sandy silt, gravel, dry, no odor; Bottom 1' - Dk. brown/black sandy clay, moist, odor, some gravels |    |                                                     |
| -5              |                                                       | 117          | [4-8'] (BC=8-6-9-7-3-2-5-3) 2' Recovery - Top 1' - Same as above; Bottom 1' - Black fine sand, little clay, wet, strong odor                                          |   |                                                     |
| -10             |                                                       | 95.7         |                                                                                                                                                                       |                                                                                      |                                                     |
| -15             |                                                       | 119          | [8-12'] (BC=5-3-3-2-3-1-2-4) No Recovery                                                                                                                              |  |                                                     |
|                 |                                                       | 23.6         | [12-16'] (BC=WOH-WOH-2-3-3-3-3-3) 6" Recovery - Gray clay, little sand, moist (native)                                                                                |  | Boring complete to 16' (no waste material observed) |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-44-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/12/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeves  
TOTAL DEPTH: 26'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                            | LITH-<br>OLOGY | COMMENTS               |
|-----------------|----------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    | 0.0          | [0-4'] (BC=4-5-6-6-8-18-25-16) Full Recovery - Grass, orange/brown silty clay to 3', moist; 4" - yellow/tan sand; 8"-gray sand and gravel, moist |                |                        |
|                 |                                                          | 1.2          |                                                                                                                                                  |                |                        |
|                 |                                                          | 2.1          |                                                                                                                                                  |                |                        |
|                 |                                                          | 2.9          | [4-8'] (BC=9-15-16-32-26-18-4-2) 2' Recovery - Same as above - gray gravels, little sand, visible brown product (SPH) in gravel, strong odor     |                |                        |
| -5              | Sample<br>taken 10-<br>12' for<br>laboratory<br>analysis | 52.1         |                                                                                                                                                  |                |                        |
|                 |                                                          | 136          | [8-10'] (BC=1-1-1-1) Full Recovery - Black silty clay, visible product, moist/wet, strong odor, loose                                            |                |                        |
| -10             |                                                          | 242          | [10-14'] (BC=WOH-1-2-3-4-15-23-24) Full Recovery - Top 2' - Same as above; Bottom 2' - White, dry, waxy material                                 |                |                        |
|                 |                                                          | 516          | [14-18'] (BC=WOH-WOH-WOH-WOH-WOH-WOH-5-4) Same as above, waxy resin and woody material, strong odor                                              |                |                        |
| -15             | Sample<br>taken 24-<br>26' for<br>laboratory<br>analysis | 445          | [18-22'] (BC=8-7-18-16-24-12-4-8) Full Recovery - Waxy resin, strong odor                                                                        |                |                        |
| -20             |                                                          |              |                                                                                                                                                  |                |                        |
|                 |                                                          | 37.6         | [22-26'] (BC=4-6-4-4-4-2-2-4) Full Recovery - Dark gray sandy clay, moist (native), slight odor                                                  |                |                        |
| -25             |                                                          |              |                                                                                                                                                  |                | Boring complete to 26' |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-45-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/12/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeves  
TOTAL DEPTH: 22'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                    | LITH-<br>OLOGY | COMMENTS               |
|-----------------|----------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    | 2.4          | [0-4'] (BC=WOH-3-4-4-2-2-7-8) Top 2' - Grass,<br>brown stiff silt, some clay, little sand, moist; Bottom<br>2' - Gray/dk. gray medium sands, odor, moist |                |                        |
| -5              |                                                          |              | [4-8'] (BC=1-1-1-2-4-4-5-8) 2' Recovery - Top 1' -<br>Black silt, clay, strong odor, moist; Bottom 1' -<br>white/waxy resin                              |                |                        |
|                 | Sample<br>taken 5-8'<br>for<br>laboratory<br>analysis    | 33.0         | [8-10'] (BC=7-9-10-12) Full Recovery - Wood<br>material, brick, black/dark brown silt; Bottom 2" -<br>white/waxy resin, some tar, black/oily             |                |                        |
| -10             |                                                          |              | [10-14'] (BC=WOH-WOH-30-30/13) Wood, drilled<br>to 14'                                                                                                   |                |                        |
| -15             | Sample<br>taken 18-<br>20' for<br>laboratory<br>analysis |              | [14-18'] (BC=WOH-2-1-4-6-6-5-7) 6" Recovery -<br>Dark brown/black wet sandy silt, little clay                                                            |                |                        |
| -20             |                                                          |              | [18-22'] (BC=WOH-2-2-2-2-3-3-5) 6" Recovery -<br>Dark gray clay and sand, moist/wet (native)                                                             |                |                        |
|                 |                                                          |              |                                                                                                                                                          |                | Boring complete to 22' |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-46-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/12/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeves  
TOTAL DEPTH: 18'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                  | LITH-<br>OLOGY | COMMENTS               |
|-----------------|----------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    |              | [0-4'] (BC=WOH-3-6-5-4-5-7-6) 2' Recovery - Top 1' - Grass, brown, moist/stiff silt and clay, some gravels; Bottom 1' - Brown/black sand and clay, some gravels, moist |                |                        |
|                 |                                                          | 0.0          |                                                                                                                                                                        |                |                        |
|                 | Sample<br>taken 5-8'<br>for<br>laboratory<br>analysis    | 0.0          | [4-8'] (BC= 2-3-3-14-23-10) 2' Recovery - Top 1' - Same as above; Bottom 1' - Black sludge/waxy/oily material, some sand/clay, stiff, moist, slight odor               |                |                        |
| -5              |                                                          | 4.8          |                                                                                                                                                                        |                |                        |
|                 |                                                          | 10.7         | [8-10'] (BC=2-5-7-11) Full Recovery - Black clay, moist, odor, stiff                                                                                                   |                |                        |
|                 |                                                          | 12.2         |                                                                                                                                                                        |                |                        |
| -10             |                                                          | 2.2          |                                                                                                                                                                        |                |                        |
|                 |                                                          | 8.6          |                                                                                                                                                                        |                |                        |
|                 |                                                          | 10.2         | [10-14'] (BC=WOH-3-5-6-6-8-8-7) 3' Recovery - Black clay, crumbles in intervals, moist, odor (SAA)                                                                     |                |                        |
|                 |                                                          | 8.4          |                                                                                                                                                                        |                |                        |
| -15             |                                                          | 11.9         |                                                                                                                                                                        |                |                        |
|                 | Sample<br>taken 17-<br>18' for<br>laboratory<br>analysis | 7.8          | [14-18'] (BC=2-5-7-7-9-7-15-18) Full Recovery - Top 2' - Wet, same as above; Bottom 2' - gray/dk. gray sand (native) and gravel, sl. odor, moist                       |                |                        |
|                 |                                                          | 14.3         |                                                                                                                                                                        |                |                        |
|                 |                                                          | 2.6          |                                                                                                                                                                        |                | Boring complete to 18' |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-47**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/19/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                   | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Wet, grass/moss, brown sandy silt and gravel            | ^ ^ ^          |          |
|                 |                                                       | 0.0          |                                                         | ^ ^ ^          |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Same as above, change to black @ 2', some brick<br>fill | ^ ^ ^          |          |
|                 |                                                       | 0.0          |                                                         | ^ ^ ^          |          |



# SUBSURFACE BORING LOG

**BOREHOLE NO. BH-10-48**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hollow Stem Auger

JOB NO.:

SAMPLING METHOD Acetate Sleeve

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 12'

DATES DRILLED: 4/14/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                    | LITH-<br>OLOGY | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=5-7-15-9-5-10-12-8) 3' Recovery - 1' - Grass, brown sandy silt and gravel, moist; 1' - Brick frags, fill, tan sand and gravel; 1' - Black sand and gravel, some silt, dry, slightly micaceous |                |                                                     |
|                 |                                                       | 14.4         |                                                                                                                                                                                                          |                |                                                     |
|                 |                                                       | 9.7          |                                                                                                                                                                                                          |                |                                                     |
|                 |                                                       | 8.6          | [4-8'] (BC=5-3-3-4-4-10-6) 3' Recovery - Dark gray/black fine sand w/ clay, wet, slightly micaceous                                                                                                      |                |                                                     |
| -5              |                                                       | 6.3          |                                                                                                                                                                                                          |                |                                                     |
|                 |                                                       | 4.7          |                                                                                                                                                                                                          |                |                                                     |
|                 |                                                       | 8.1          | [8-12'] (BC=3-3-1-2-1-1-2-3) Full Recovery - 2' - Same as above, strong odor, moist; 2' - Dark gray clay w/ some sand, moist, organics at bottom, slightly micaceous                                     |                |                                                     |
|                 |                                                       | 16.8         |                                                                                                                                                                                                          |                |                                                     |
| -10             |                                                       | 17.1         |                                                                                                                                                                                                          |                |                                                     |
|                 |                                                       | 19.6         |                                                                                                                                                                                                          |                | Boring complete to 12' (no waste material observed) |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-49**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/19/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                          | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|--------------------------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown silt to gray/tan sand and gravels, dry                            |                |          |
|                 |                                                       | 0.0          |                                                                                |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Same as above, change to black/dk. brown sandy<br>silt and gravels, wet @ 1.5' |                |          |
|                 |                                                       | 0.0          |                                                                                |                |          |

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

**SITE LOCATION: AOI-10**

DRILLING METHOD **Hand Auger**

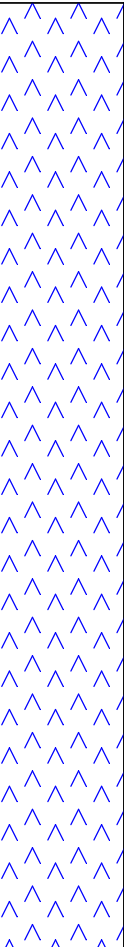
JOB NO.:

|                 |      |
|-----------------|------|
| SAMPLING METHOD | Grab |
|-----------------|------|

LOGGED BY: **Shaun Sykes**

TOTAL DEPTH: 2'

DATES DRILLED: 4/19/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                 | LITH-<br>OLOGY                                                                      | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          | Grass, brick/glass/cinders, fill, brown sandy silt and gravel, dry    |  |          |
|                 |                                                       | 0.0          | Dark brown sandy silt and gravel, fill material - brick, cinders, dry |                                                                                     |          |





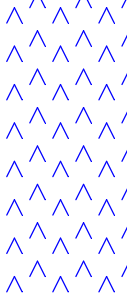
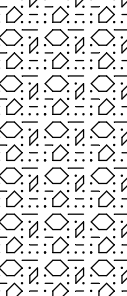
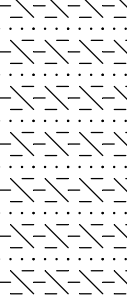
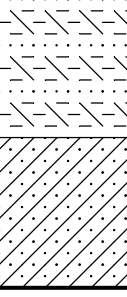
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-51**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 20'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                               | LITH-<br>OLOGY                                                                       | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=WOH-6-10-9-3-5-8-11) Full Recovery - 2' - Grass, dk. brown/brown sandy silt and gravel; 2' - Gray f/c sand and gravel, some dense balck silt/clay, moist, some brick frags/fill material |    |                                                     |
| -5              |                                                       | 0.0          |                                                                                                                                                                                                     |                                                                                      |                                                     |
|                 |                                                       | 4.4          | [4-8'] (BC=5-9-3-3-2-5-6-7) No Recovery                                                                                                                                                             |                                                                                      |                                                     |
| -10             |                                                       | 9.8          | [8-12'] (BC=1-3-22-50-31-5-3-3) 2' Recovery - Tan/brown sandy silt and gravel, wet/moist, some/little sandy clay at bottom 2"                                                                       |  |                                                     |
| -15             |                                                       | 8.2          | [12-16'] (BC=2-3-3-5-4-2-3-3) 2' Recovery - Black/dk. gray f/c sand and gravel w/ clay, slight odor                                                                                                 |  |                                                     |
| -20             |                                                       | 16.7         |                                                                                                                                                                                                     |                                                                                      |                                                     |
|                 |                                                       | 21.5         | [16-20'] (BC=8-7-29-5-7-7-4-3) Full Recovery - 2' - Same as above w/ some brick frags, wet; 2' - Dk. gray/black fine sandy clay, sl. micaceous, moist                                               |  |                                                     |
|                 |                                                       | 10.9         |                                                                                                                                                                                                     |                                                                                      |                                                     |
|                 |                                                       | 9.2          |                                                                                                                                                                                                     |                                                                                      |                                                     |
|                 |                                                       | 2.2          |                                                                                                                                                                                                     |                                                                                      |                                                     |
|                 |                                                       |              |                                                                                                                                                                                                     |                                                                                      | Boring complete to 20' (no waste material observed) |



# SUBSURFACE BORING LOG

**BOREHOLE NO. BH-10-52**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                      | LITH-<br>OLOGY | COMMENTS                                               |
|-----------------|-------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          | [0-2'] (BC=3-2-6-6) Full Recovery - Grass,<br>brown/tan sand and silt, moist, some brick fill                                                                                              |                |                                                        |
|                 |                                                       | 0.0          | [2-4'] (BC=6-16-14-16) Full Recovery - Brown/gray<br>dense sandy silt and gravels, some brick/plastic fill<br>material, sl. moist                                                          |                |                                                        |
|                 |                                                       | 0.0          |                                                                                                                                                                                            |                |                                                        |
|                 |                                                       | 0.0          | [4-8'] (BC=3-9-2-14-5-5-9-11) Full Recovery - Top<br>2' - Same as above w/ wood 5-6', fill, brown, some<br>brick; Bottom 2' - Brown/dk. brown sandy clay w/<br>gravel, micaceous           |                |                                                        |
| -5              |                                                       | 4.3          |                                                                                                                                                                                            |                |                                                        |
|                 |                                                       | 3.5          |                                                                                                                                                                                            |                |                                                        |
|                 |                                                       | 1.9          | [8-12'] (BC=35-16-14-15-11-13-17-13) 2' Recovery<br>- Top 1' - Same as above; Bttom 1' - Dk.<br>brown/black f/c sand and gravel, some clay, bits of<br>fabric material and brick fill, wet |                |                                                        |
| -10             |                                                       | 2.4          |                                                                                                                                                                                            |                |                                                        |
|                 |                                                       | 27.3         | [12-16'] (BC=16-4-4-5-3-3-3-3) 1' Recovery - Dk.<br>gray/black clay, trace f. sand, sl. micaceous, moist                                                                                   |                |                                                        |
|                 |                                                       | 6.2          |                                                                                                                                                                                            |                |                                                        |
| -15             |                                                       | 4.3          |                                                                                                                                                                                            |                | Boring complete to 16' (no<br>waste material observed) |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-53**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/22/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                             | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Wet, reeds/grass, tan/brown silty f/c sand, roots |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                                   |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-54**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/22/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                     | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|-------------------------------------------|----------------|----------|
| 0               |                                                       |              | Dk. brown silty f/c sand, wet @ 6", roots |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                           |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-55-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hollow Stem Auger

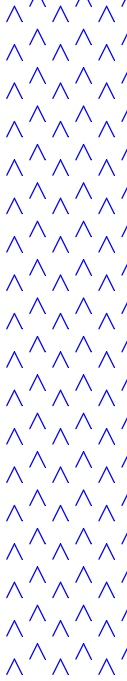
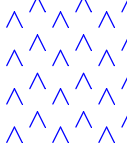
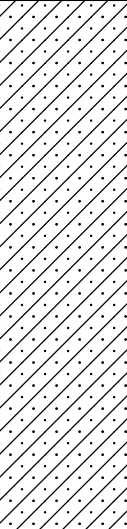
JOB NO.:

SAMPLING METHOD Acetate Sleeves

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 22'

DATES DRILLED: 4/12/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                              | LITH-<br>OLOGY                                                                       | COMMENTS               |
|-----------------|----------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    | 2.2          | [0-4'] (BC=WOH-7-5-3-6-2-1-5) 3' Recovery -<br>Grass, brown silt, sand and gravel, moist; Bottom 2'<br>- gray/brown sandy silt and gravel, moist                                                   |   |                        |
| -5              |                                                          |              | [4-8'] (BC=3-2-1-1-1-4-3-7) 2' Recovery - Top 1' -<br>Same as above w/ styrofoam pieces; Bottom 1' -<br>Black/dk. gray sand and clay, odor, moist                                                  |                                                                                      |                        |
|                 | Sample<br>taken 5-8'<br>for<br>laboratory<br>analysis    | 20.6         | [8-10'] (BC=18-65-50/4) 1' Recovery - Thin clear<br>plastic sheeting, black sandy silt and some gravel,<br>odor, moist, loose                                                                      |  |                        |
| -10             |                                                          |              | [10-14'] (BC=1-1-6-4-4-4-4-6) 3' Recovery -<br>Brick/black sand, some clay and gravel, amber<br>colored waxy resin @ 13', change to all black sand<br>(trace clay) @ 13.5', slight odor, moist/wet |                                                                                      |                        |
| -15             |                                                          | 4.8          | [14-18'] (BC=1-1-1-2-4-5-6-6) 2' Recovery -<br>Black/dk. gray/brown sand and gravel, some clay<br>(native), moist/wet                                                                              |  |                        |
| -20             |                                                          |              | [18-22'] (BC=2-2-3-4-1-3-1-1) 6" Recovery - Dark<br>gray fine sand, some clay, moist                                                                                                               |                                                                                      |                        |
|                 | Sample<br>taken 20-<br>22' for<br>laboratory<br>analysis | 7.1          |                                                                                                                                                                                                    |                                                                                      | Boring complete to 22' |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-56-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/12/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 24'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                      | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                      | LITH-<br>OLOGY | COMMENTS               |
|-----------------|---------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis   | 4.9          | [0-4'] (BC=1-7-12-10-15-18-20-23) Full Recovery - Top 2' - Grass, tan/brown sandy silt and gravel, moist; Bottom 2' - Gravel/sand and concrete, dry, tight |                |                        |
| -5              |                                                         |              | [4-8'] (BC=13-13-11-14-19-17-15-13) 2' Recovery - Gray/crumbly fine sandy silt and some gravels, tight, dry                                                |                |                        |
|                 | Sample<br>taken 10-12'<br>for<br>laboratory<br>analysis | 33.7         |                                                                                                                                                            |                |                        |
|                 |                                                         | 43.3         | [8-10'] (BC=6-6-2-4) 4" Recovery - Gray silty clay, thin clear plastic sheeting w/ thick yellow plastic                                                    |                |                        |
| -10             |                                                         | 112          | [10-14'] (BC=WOH-13-16-21-20-8-6-11) 2' Recovery - Dark brown/black sand and gravel, some clay, fabric material, some white waxy resin, moist, strong odor |                |                        |
| -15             | Sample<br>taken 22-24'<br>for<br>laboratory<br>analysis | 12.1         | [14-18'] (BC=WOH-3-14-16-57-21-19-19) 2' Recovery - Same as above w/ black tar/oily material                                                               |                |                        |
|                 |                                                         |              | [18-20'] (BC=50/0.3) Concrete, drilled to 20'                                                                                                              |                |                        |
| -20             |                                                         |              | [20-24'] (BC=6-1-1-1-1-1-2) Black wet fine sand, gray clay w/ organics in bottom 6", moist                                                                 |                |                        |
|                 |                                                         |              |                                                                                                                                                            |                | Boring complete to 24' |





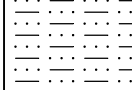
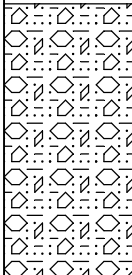
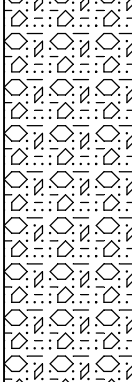
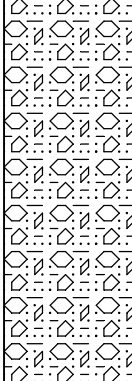
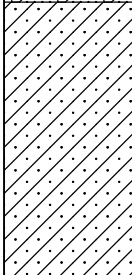
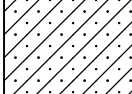
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-57**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                             | LITH-<br>OLOGY                                                                       | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=2-2-3-4-5-4-5-6) 1' - Tan/brown sandy silt, wet; 3' - Black f/c sand and gravel, wet   |    |                                                     |
|                 |                                                       | 6.8          |                                                                                                   |    |                                                     |
|                 |                                                       | 417.3        | [4-8'] (BC=4-4-2-3-2-3-2-3) Black sand and gravel, strong odor, visible oil/product               |   |                                                     |
| -5              |                                                       | 1372         |                                                                                                   |  |                                                     |
|                 |                                                       | 1361         | [8-12'] (BC=2-1-2-2-2-3-2-3) 1' Recovery - Same as above w/ some clay                             |  |                                                     |
| -10             |                                                       | 632          |                                                                                                   |  |                                                     |
|                 |                                                       | 717          | [12-16'] (BC=3-3-3-3-3-3-3-3) 1' Recovery - Gray/dk. gray f. sandy clay with brown organics (20%) |  |                                                     |
|                 |                                                       | 34.8         |                                                                                                   |                                                                                      |                                                     |
| -15             |                                                       | 17.2         |                                                                                                   |                                                                                      | Boring complete to 16' (no waste material observed) |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-58**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                           | LITH-<br>OLOGY | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 3.2          | [0-4'] (BC=WOH-WOH-WOH-1-1-1-2-2-WOH-WOH) 1' Recovery - Grass, brown sandy silt, wet, some gravel/root material |                |                                                     |
| -5              |                                                       |              | [4-8'] (BC=WOH-WOH-2-4-4-6-7-4) Black, wet, loose sand f/c, some silt/clay, gravel                              |                |                                                     |
| -10             |                                                       |              | [8-12'] (BC=4-2-5-3-2-3-2-2) No Recovery                                                                        |                |                                                     |
| -15             |                                                       |              | [12-16'] (BC=2-2-2-2-3-4-4-4) Brown/dk. gray f. sandy clay w/ organics (brown) 10-20%                           |                | Boring complete to 16' (no waste material observed) |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-59**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/22/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                    | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|--------------------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Brown sandy silt, brick frags, some amber/white waxy resin material, dry |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                                                          |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-60**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/22/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                  | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------|----------------|----------|
| 0               |                                                       |              | Dk. brown/black f/c sand and silt, dry |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                        |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-61**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/22/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                        | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------|----------------|----------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          | Light brown silty f/c sand, wet, roots/reeds |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-62**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/22/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                 | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|-------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Roots/reeds, dk. brown silty f/c sand w/ gravels, wet |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                       |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-63-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/13/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 25'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                      | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                             | LITH-<br>OLOGY | COMMENTS |
|-----------------|---------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis   |              | [0-4'] (BC=1-4-9-7-9-10-6-4) 3' Recovery - Brown/orange brown fine sandy silt, moist, some gravels, tight                                                         |                |          |
|                 |                                                         | 0.0          |                                                                                                                                                                   |                |          |
|                 |                                                         | 0.0          |                                                                                                                                                                   |                |          |
|                 |                                                         | 0.8          |                                                                                                                                                                   |                |          |
| -5              | Sample<br>taken 12-14'<br>for<br>laboratory<br>analysis |              | [4-8'] (BC=3-2-3-4-8-24-21-24) 2.5' Recovery - Top 2' - Brown/gray brown f. sandy silt, some clay; Bottom 6" - Dark gray/green fine sand, some clay, moist, dense |                |          |
|                 |                                                         | 4.6          |                                                                                                                                                                   |                |          |
|                 |                                                         | 18.4         |                                                                                                                                                                   |                |          |
|                 |                                                         | 26.2         |                                                                                                                                                                   |                |          |
|                 |                                                         | 20.2         | [8-10'] (BC=8-63-30/.2) Brown/gray sandy silt, moist, some gravels                                                                                                |                |          |
|                 |                                                         | 83.3         | [10-12'] (BC=2-50/.3) 6" Recovery - Concrete, black sand and fill material, some gravel                                                                           |                |          |
| -10             | Sample<br>taken 21-23'<br>for<br>laboratory<br>analysis | 52.9         | [12-14] (BC=36-50/.3) 1' Recovery - Top 6" - Black sand/gravel in clay, strong odor, wet; Bottom 6" - Saw dust/wood/plastic/fiber particles, wet                  |                |          |
|                 |                                                         |              | [14-15] (BC=65-50/.4) Little Recovery - Dark brown/black sand, gravel, cloth/fiber material, clear thin plastic material, drilled to 17'                          |                |          |
| -15             |                                                         |              | [17-19'] (BC=13-12-8-9) Full Recovery - Black sand and gravels, some clay, strong odor, wood particles                                                            |                |          |
|                 |                                                         |              | [19-23'] (BC=7-8-12-11-5-5-4-4) No recovery - re-drive                                                                                                            |                |          |
| -20             |                                                         | 256          |                                                                                                                                                                   |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-64-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hollow Stem Auger

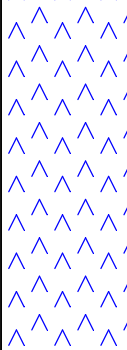
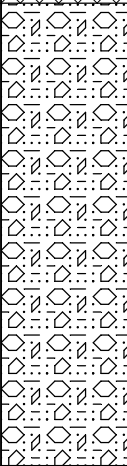
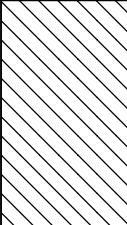
JOB NO.:

SAMPLING METHOD Acetate Sleeve

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 26'

DATES DRILLED: 4/13/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                   | LITH-<br>OLOGY                                                                       | COMMENTS               |  |  |
|-----------------|----------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|--|--|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    | 2.1          | [0-4'] (BC=9-13-19-12-10-8-6-6) 3' Recovery - Top 6" - Grass, medium brown silty clay, moist; Middle 12" - Red/black slag material w/ gravels, dry, metallic; Bottom 6" - Dark gray/black silt and sand |    |                        |  |  |
|                 |                                                          | 18.7         |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
|                 |                                                          | 24.2         |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
|                 |                                                          | 36.5         |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
| -5              | Sample<br>taken 11-<br>13' for<br>laboratory<br>analysis |              | [4-8'] (BC=5-4-2-2-2-1-1-2) No recovery                                                                                                                                                                 |   |                        |  |  |
|                 |                                                          | 26.2         | [8-10'] (BC=9-14-10-12) 1' Recovery - Black sand/clay, brick fragments, large gravel in bottom, strong odor                                                                                             |                                                                                      |                        |  |  |
| -10             |                                                          | 250          | [10-14'] (BC=4-4-31-20-6-5-4-5) 2' Recovery - Black/dark gray sand and gravel, glass fragments, cement fragments, moist/wet, strong odor, trace clay                                                    |                                                                                      |                        |  |  |
|                 |                                                          | 172          | [14-18'] (BC=8-5-4-2-3-2-13-14) 2' Recovery - Black/gray sand and gravel in clay, moist/wet, strong odor/oily, light gray clay in bottom 2"                                                             |                                                                                      |                        |  |  |
|                 |                                                          | 199          |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
| -15             |                                                          | 88.5         |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
|                 | Sample<br>taken 24-<br>26' for<br>laboratory<br>analysis | 109          | [18-22'] (BC=WOH-5-7-4-4-5-5-7) Same as above, little recovery, wet                                                                                                                                     |  |                        |  |  |
|                 |                                                          | 117          |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
| -20             |                                                          |              |                                                                                                                                                                                                         |                                                                                      |                        |  |  |
|                 |                                                          |              | [22-26'] (BC=8-6-7-7-6-6-7-6) 3' Recovery - Gray clay w/ brown organics 20-30% (native), moist, slight odor                                                                                             |  |                        |  |  |
| -25             |                                                          |              |                                                                                                                                                                                                         |                                                                                      | Boring complete to 26' |  |  |





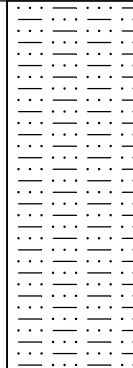
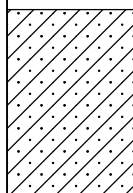
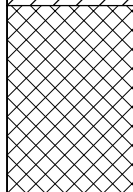
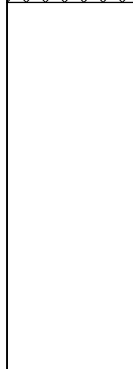
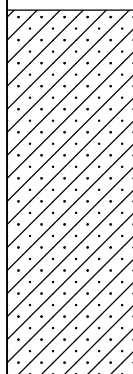
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-65**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                       | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                             | LITH-<br>OLOGY                                                                       | COMMENTS               |
|-----------------|----------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis    | 33.9         | [0-4'] (BC=WOH/4') 1' Recovery - Grass, brown<br>sandy silt, some clay, moist                                                                                     |    |                        |
| -5              |                                                          |              | [4-8'] (BC=WOH-WOH-WOH-WOH-2-5-5-7) Full<br>Recovery - Top 2' - Black sandy clay, moist/wet;<br>Bottom 2' - Fiber material, black oily sludge/tar,<br>strong odor |   |                        |
|                 | Sample<br>taken 6-8'<br>for<br>laboratory<br>analysis    | 206          |                                                                                                                                                                   |  |                        |
|                 |                                                          | 312          | [8-12'] (BC=1-1-1-1-1-2-1-1) No Recovery                                                                                                                          |  |                        |
| -10             |                                                          | 22.4         | [12-16'] (BC=3-4-3-3-4-2-2-2) 2' Recovery - Gray f.<br>sandy clay, moist                                                                                          |  |                        |
| -15             | Sample<br>taken 14-<br>16' for<br>laboratory<br>analysis | 10.2         |                                                                                                                                                                   |  |                        |
|                 |                                                          |              |                                                                                                                                                                   |                                                                                      | Boring complete to 16' |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-66**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

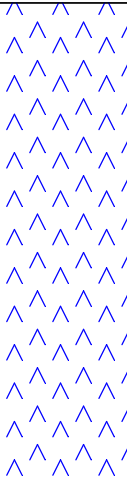
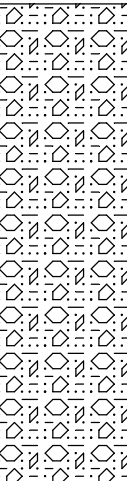
JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/21/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                     | LITH-<br>OLOGY                                                                      | COMMENTS |
|-----------------|-------------------------------------------|--------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| 0               |                                           |              | Trash/garbage, sticks/wood, brown/tan f/c sandy clay, wet |   |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                           |                                                                                     |          |
|                 |                                           | 1.1          | Coarse sand and gravel, some brown/tan clay, wet          |  |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-67**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                      | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown f/c sandy silt and gravel, moist,<br>increased sands w/ depth |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                                                            |                |          |
|                 |                                                       | 4.2          | Wet, black fine sand                                                       |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-68**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/14/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 20'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                                     | LITH-<br>OLOGY | COMMENTS                                               |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=1-20-25-27-28-35-25-12) Full Recovery -<br>1' - Grass, brown sandy silt and gravel, moist; 2' -<br>Sand and gravel, f/c, moist/wet, gray/red/white; 1' -<br>Black sand and gravel, f/c, little clay, moist/wet |                |                                                        |
|                 |                                                       | 1.1          |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       | 2.8          |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       | 2.9          | [4-8'] (BC=1-2-9-18-10-4-1-1) Litte (4") Recovery -<br>Same as above, wet                                                                                                                                                 |                |                                                        |
| -5              |                                                       | 36.9         |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       |              | [8-12'] (BC=2-2-4-4-2-1-3-2) Black f. sandy clay, sl.<br>micaceous, wet, odor                                                                                                                                             |                |                                                        |
| -10             |                                                       | 47.2         |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       |              | [12-16'] (BC=3-2-3-3-3-3-4) No recovery, wet                                                                                                                                                                              |                |                                                        |
| -15             |                                                       |              |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       |              | [16-20'] (BC=4-4-4-3-3-4-3-3) 1' Recovery - Dark<br>gray/black clay w/ brown organics 20-30%, moist<br>50% organics bottom 3"                                                                                             |                |                                                        |
| -20             |                                                       | 2.5          |                                                                                                                                                                                                                           |                |                                                        |
|                 |                                                       |              |                                                                                                                                                                                                                           |                | Boring complete to 20' (no<br>waste material observed) |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-69-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/12/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                           | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                                     | LITH-<br>OLOGY | COMMENTS               |
|-----------------|--------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis        | 0.0          | [0-4'] (BC=1-3-5-7-14-6-6-3-4-8) 2' Recovery - Top 18" - Grass, med. brown silt and some sand and gravels, moist, trace clay; Bottom 6" - Dark brown/orange sandy silt and gravels, trace clay                            |                |                        |
| -5              |                                                              | 0.0          | [4-8'] (BC=4-3-4-10-7-6-15-18) 3' Recovery - Top 8" - Orange/brown silty clay, moist; Middle 2" - Tan fine sand, moist/wet; Bottom 14" - Black/dk. brown silty material, moist, strong odor, some black/oily tar material |                |                        |
|                 | Sample<br>taken 5-8'<br>for<br>laboratory<br>analysis        | 2.1          |                                                                                                                                                                                                                           |                |                        |
|                 |                                                              | 5.6          |                                                                                                                                                                                                                           |                |                        |
|                 |                                                              | 8.7          |                                                                                                                                                                                                                           |                |                        |
|                 |                                                              | 12.4         | [8-10'] (BC=35-50/1) No Recovery                                                                                                                                                                                          |                |                        |
| -10             |                                                              |              | [10-12'] (BC=17-50/3) 6" Recovery - Large gravels some brown sandy silt, dry                                                                                                                                              |                |                        |
|                 |                                                              |              | [12-16'] (BC=4-4-3-3-3-1-2) 3' Recovery - Top 2' - Black silty sand, wet, sl. odor; Bottom 1' - Gray silty sand (native), wet                                                                                             |                |                        |
| -15             | Sample<br>taken<br>15.5-16'<br>for<br>laboratory<br>analysis |              |                                                                                                                                                                                                                           |                | Boring complete to 16' |



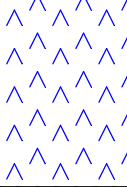
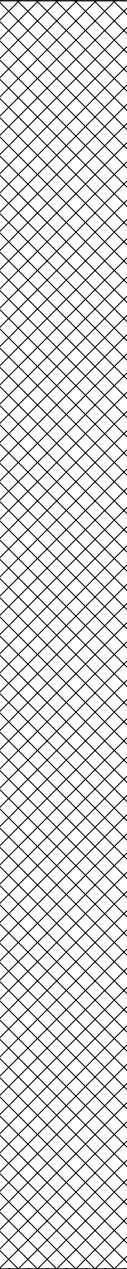
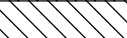
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-70-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/11/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Direct Push - Grab  
TOTAL DEPTH: 16'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                           | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                                                                                                | LITH-<br>OLOGY                                                                       | COMMENTS               |
|-----------------|--------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis        |              | [0-4'] (BC=1-1-4-6-8-14-16-15) - 2.5' Recovery - Top 22" - Cover, orange-brown sandy clay, fill w/ gravel and roots, moist; Bottom 8" - Black, mostly fine-grained material (asphalt or tar) crumbles like soil in parts and stiff/pliable like soft asphalt in others, some gravels |    |                        |
|                 |                                                              | 0.1          |                                                                                                                                                                                                                                                                                      |   |                        |
|                 |                                                              | 0.9          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 | Sample<br>taken 5-8'<br>for<br>laboratory<br>analysis        | 1.3          | [4-8'] (BC=4-5-12-20-15-15-15-9) - Full Recovery - Same black silty material to 5'; 5-8' - Pure white waxy material, hard like resin in spots                                                                                                                                        |                                                                                      |                        |
| -5              |                                                              | 1.3          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 |                                                              | 2.0          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 |                                                              | 0.6          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 |                                                              | 0.6          | [8-12'] (BC=4-14-7-9-12-6-4-4) - 1' Recovery - 2" waxy material in w/ black material, gravel, wet at bottom - very strong odors, black oily material (asphalt) - sandy parts of fill holding oil                                                                                     |                                                                                      |                        |
|                 |                                                              | 5.4          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
| -10             |                                                              | 7.9          |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 |                                                              |              | [12-16'] (BC=4-3-2-2-1-3-3-3) - 2.5' Recovery - Black fill/waste material to 15.5', gray clay - native (odors)                                                                                                                                                                       |                                                                                      |                        |
|                 |                                                              | 36.4         |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
|                 | Sample<br>taken<br>15.5-16'<br>for<br>laboratory<br>analysis | 36.9         |                                                                                                                                                                                                                                                                                      |                                                                                      |                        |
| -15             |                                                              | 20.4         |                                                                                                                                                                                                                                                                                      |  | Boring complete to 16' |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-71**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/5/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                          | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|----------------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Grass, orange/brown sandy silt w/ organic matter, dry, no odor |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                                |                |          |
|                 |                                           | 5.7          | Change to balck sand and mixed gravels, dry, no odor           |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-72**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/5/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                        | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                            | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------|--------------|------------------------------------------------------------------|----------------|----------|
| 0               |                                           |              | Grass, dk. brown/black silt w/ organic matter, wet @ 1', no odor |                |          |
|                 | Sample taken 0-2' for laboratory analysis | 0.0          |                                                                  |                |          |
|                 |                                           | 9.3          | Black sand and gravels w/ some black silt, wet, slight odor      |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-73**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/5/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                           | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, dark brown /black silt, trace sand, wet @ 1',<br>no odor |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis | 0.0          |                                                                 |                |          |
|                 |                                                       | 0.0          | Black sand and gravels w/ some black silt, wet,<br>slight odor  |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-75**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hollow Stem Auger

JOB NO.:

SAMPLING METHOD Acetate Sleeve

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 28'

DATES DRILLED: 4/18/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                          | LITH-<br>OLOGY | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=1-7-15-11-12-13-11-12) 2' Recovery - Grass, brown sandy silt w/ gravel, fill-brick and cinders, dry                                                 |                |                                                     |
|                 |                                                       | 0.0          |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 2.8          | [4-8'] (BC=10-7-9-7-11-30-7-11) 2' Recovery - 1' - Same as above; 1' - Black/gray sand, trace clay, orange/brick/cinder in bottoms, dry, some plastic material |                |                                                     |
|                 |                                                       | 8.8          |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 47.8         | [8-12'] (BC=10-12-9-6-4-6-7-14) Full Recovery - Black fine sand w/ some clay, few gravels, wood/orangic matter, moist, strong odor                             |                |                                                     |
| -10             |                                                       | 112          |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 262          |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 273          | [12-16'] (BC=4-4-6-5-10-11-9-17) 1' Recovery - Black fine sand, moist                                                                                          |                |                                                     |
|                 |                                                       | 44.8         |                                                                                                                                                                |                |                                                     |
| -15             |                                                       | 14.7         | [16-20'] (BC=10-6-3-4-3-2-3-3) 1' Recovery - Black f/c sand and gravel, wet, odor                                                                              |                |                                                     |
|                 |                                                       | 10.7         |                                                                                                                                                                |                |                                                     |
| -20             |                                                       | 23.0         | [20-24'] (BC=WOH-WOH-6-16-8-7-4-5) 1' Recovery - Same as above                                                                                                 |                |                                                     |
|                 |                                                       | 31.9         |                                                                                                                                                                |                |                                                     |
| -25             |                                                       | 151          | [24-28'] (BC=3-3-3-4-2-4-3-9) Full Recovery - Dk. gray clay w/ some fine sand, organics (20%) (native)                                                         |                |                                                     |
|                 |                                                       | 13.3         |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 7.6          |                                                                                                                                                                |                |                                                     |
|                 |                                                       | 4.1          |                                                                                                                                                                |                |                                                     |
|                 |                                                       |              |                                                                                                                                                                |                | Boring complete to 28' (no waste material observed) |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-76**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/20/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|------------------------------------------------------|----------------|----------|
| 0               |                                                       |              |                                                      |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Grass, brown sandy silt, some gravel/brick fill, dry |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-77-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/13/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 22'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                                                | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                                                                     | LITH-<br>OLOGY | COMMENTS               |
|-----------------|-----------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis                             |              | [0-4'] (BC=WOH-1-2-4-6-6-33-15) 2' Recovery - Grass, brown sandy silt, roots, some brick/fill material, tan silty sand @ 3-3.4', black/dark brown sandy silt 3.5-4', trace clay, dense                    |                |                        |
|                 |                                                                                   | 0.0          |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 0.0          |                                                                                                                                                                                                           |                |                        |
| -5              | Sample<br>taken 6.5-<br>7' for<br>laboratory<br>analysis<br>(**All waxy<br>resin) | 0.0          | [4-8'] (BC=WOH-3-2-3-1-5-5-7) 2' Recovery - Top 6" - Black sandy clay, moist, strong odor; Middle 6" - White/waxy resin; Bottom 6" - Dark gray/brown silty sand, strong odor, moist, some fabric material |                |                        |
|                 |                                                                                   | 2.4          |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 2.6          | [8-10'] (BC=2-5-6-2) 1.5' Recovery - Black sandy silt, mostly fabric, wood material, glass, papers, strong odor                                                                                           |                |                        |
| -10             | Sample<br>taken 10-<br>12' for<br>laboratory<br>analysis                          | 19.0         |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 34.5         | [10-14'] (BC=2-2-40-7-35-16-12-10) 3' Recovery - Top 18" - Same as above, fiber material; Middle 6" - Black fine sand, moist; Bottom 12" - Red/brown sand, silt and gravel (old brick)                    |                |                        |
|                 |                                                                                   | 67.6         |                                                                                                                                                                                                           |                |                        |
| -15             | Sample<br>taken 20-<br>22' for<br>laboratory<br>analysis                          | 119          |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 4.7          | [14-18'] (BC=WOH-6-4-4-4-6-7-6) 2' Recovery - Black, wet, loose sand f/c, some clay and gravels (native) strong odor                                                                                      |                |                        |
|                 |                                                                                   | 38.2         |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 56.4         |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   | 72.6         | [18-22'] (BC=8-6-4-9-8-6-5-5) 2' Recovery - Same as above, black fine sand w/ some clay, wet, strong odor, gray clay in tip of spoon                                                                      |                |                        |
| -20             |                                                                                   | 84.4         |                                                                                                                                                                                                           |                |                        |
|                 |                                                                                   |              |                                                                                                                                                                                                           |                | Boring complete to 22' |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-78**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                             | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown f/c sandy silt, dry                  |                |          |
|                 |                                                       | 0.0          |                                                   |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Tan/brown/orange f/c sandy silt, micaceous, moist |                |          |
|                 |                                                       | 0.0          |                                                   |                |          |



# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-79**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hand Auger

JOB NO.:

SAMPLING METHOD Grab

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 2'

DATES DRILLED: 4/21/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                               | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|-----------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown f/c sandy silt, dry                    |                |          |
|                 |                                                       | 0.0          |                                                     |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Tan/orange/gray f. sand and silt, moist, trace clay |                |          |
|                 |                                                       | 0.0          |                                                     |                |          |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-80**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD Hand Auger  
SAMPLING METHOD Grab  
TOTAL DEPTH: 2'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                      | LITH-<br>OLOGY | COMMENTS |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------------------------------------|----------------|----------|
| 0               |                                                       |              | Grass, brown f/c sandy silt, dry, micaceous                                |                |          |
|                 | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | Tan/orange/gray f. sand and silt, trace clay,<br>moist/wet @ 2', micaceous |                |          |



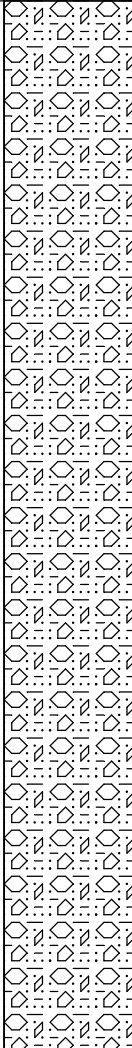
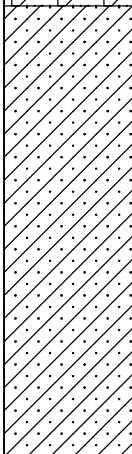
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-81**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 10'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                      | LITH-<br>OLOGY                                                                       | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=WOH-3-10-9-9-4-3-1) 2' Recovery - Grass, brown f/c sand, silt and gravel, moist                                 |   |                                                     |
|                 |                                                       | 0.0          |                                                                                                                            |                                                                                      |                                                     |
|                 |                                                       | 0.0          | [4-8'] (BC=1-2-3-3-2-3-3-3) 3' Recovery - 2' - Coarse sands and gravel, wet; 1' - Gray clay, little f. sand, some organics |                                                                                      |                                                     |
| -5              |                                                       | 14.4         |                                                                                                                            |                                                                                      |                                                     |
|                 |                                                       | 46.7         |                                                                                                                            |                                                                                      |                                                     |
|                 |                                                       | 82.8         | [8-10'] (BC=6-5) Little Recovery - Gray clay, some f. sand, wet/moist                                                      |  | Boring complete to 10' (no waste material observed) |
|                 |                                                       | 277          |                                                                                                                            |                                                                                      |                                                     |
| -10             |                                                       |              |                                                                                                                            |                                                                                      |                                                     |





# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-82-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery

DRILLING CO.: -

SITE LOCATION: AOI-10

DRILLING METHOD Hollow Stem Auger

JOB NO.:

SAMPLING METHOD Acetate Sleeve

LOGGED BY: Shaun Sykes

TOTAL DEPTH: 12'

DATES DRILLED: 4/20/11

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                               | LITH-<br>OLOGY | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=WOH-1-1-2-4-7-6-5) Full Recovery - Grass/moss, dk. brown f/c sandy silt w/ some clay, gravels, wet, little woody material                                |                |                                                     |
|                 |                                                       | 0.0          |                                                                                                                                                                     |                |                                                     |
|                 |                                                       | 4.3          |                                                                                                                                                                     |                |                                                     |
|                 |                                                       | 12.7         | [4-8'] (BC=1-1-4-12-10-15-16-4) Full Recovery - 2' - Gray/dk. gray f/c sand and gravel, wet, odor; 2' - Gray/dk. gray fine sand w/ clay at bottom, wet, strong odor |                |                                                     |
| -5              |                                                       | 58.7         |                                                                                                                                                                     |                |                                                     |
|                 |                                                       | 90.0         |                                                                                                                                                                     |                |                                                     |
|                 |                                                       | 47.8         | [8-12'] (BC=4-2-5-4-2-1-3-2) 2' Recovery - Gray clay, some fine sand w/ 20% organics, moist, odor (native)                                                          |                |                                                     |
| -10             |                                                       |              |                                                                                                                                                                     |                |                                                     |
|                 |                                                       |              |                                                                                                                                                                     |                | Boring complete to 12' (no waste material observed) |



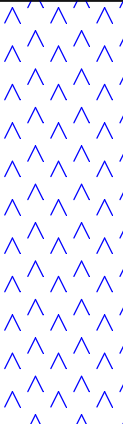
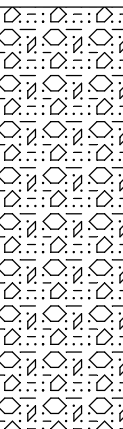
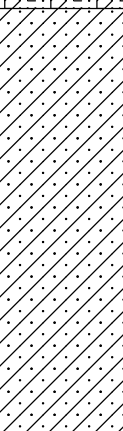
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-83-WC**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/21/11

DRILLING CO.: -  
DRILLING METHOD: Hollow Stem Auger  
SAMPLING METHOD: Acetate Sleeve  
TOTAL DEPTH: 14'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL                                    | PID<br>(ppm) | LITHOLOGY DESCRIPTION                                                                                                                                         | LITH-<br>OLOGY                                                                       | COMMENTS                                            |
|-----------------|-------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------|
| 0               | Sample<br>taken 0-2'<br>for<br>laboratory<br>analysis |              | [0-4'] (BC=3-2-3-2-2-4-6-4) 1' Recovery - Grass, brown f/c sandy silt, fill-brick, concrete, dry, some wood                                                   |    |                                                     |
| -5              |                                                       | 0.0          | [4-8'] (BC=15-14-9-6-5-5-4-2) 2' Recovery - 1' - Concrete/brick fill, f/c sand and gravel (black/dk. brown); 1' - Tan/gray f/c sand and clay, moist, no odors |   |                                                     |
|                 |                                                       | 0.0          | [8-10'] (BC=6-5) Little Recovery - Large gravels and f/c sands, wet, some tan/brown clay                                                                      |  |                                                     |
| -10             |                                                       | 4.3          | [10-14'] 1' Recovery - Gray f. sandy clay, some organics                                                                                                      |  |                                                     |
|                 |                                                       |              |                                                                                                                                                               |                                                                                      | Boring complete to 14' (no waste material observed) |





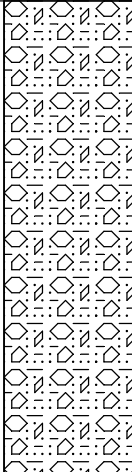
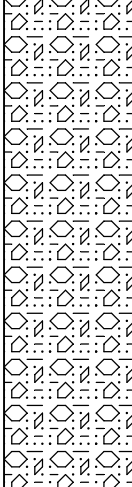
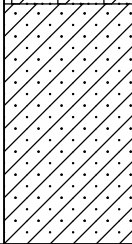
# SUBSURFACE BORING LOG

BOREHOLE NO. **BH-10-84**

Page 1 of 1

PROJECT: Sunoco - Philadelphia Refinery  
SITE LOCATION: AOI-10  
JOB NO.:  
LOGGED BY: Shaun Sykes  
DATES DRILLED: 4/22/11

DRILLING CO.: -  
DRILLING METHOD: Hand Auger  
SAMPLING METHOD: Grab  
TOTAL DEPTH: 5'

| DEPTH<br>(feet) | SAMPLE<br>INTERVAL | PID<br>(ppm) | LITHOLOGY DESCRIPTION                       | LITH-<br>OLOGY                                                                       | COMMENTS                                     |
|-----------------|--------------------|--------------|---------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|
| 0               |                    |              | Wet, brown sandy silt and gravel, some clay |    |                                              |
|                 |                    |              | Same as above, dark brown/black             |   |                                              |
|                 |                    |              | Black fine sandy clay, wet                  |  | End boring @ 5' (no waste material observed) |
| -5              |                    |              |                                             |                                                                                      |                                              |

## **APPENDIX D**

Soil, Groundwater, Sediment, and Surface  
Water Analytical Reports (on CD)



**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

May 10, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/28/2011  
Group Number: 1244429  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionLancaster Labs (LLI) #

|                           |         |
|---------------------------|---------|
| W-16_04272011 Grab Water  | 6271518 |
| W-17_04272011 Grab Water  | 6271519 |
| W-19_04272011 Grab Water  | 6271520 |
| W-20_04272011 Grab Water  | 6271521 |
| W-22_04272011 Grab Water  | 6271522 |
| W-23_04272011 Grab Water  | 6271523 |
| W-32_04272011 Grab Water  | 6271524 |
| W-32D_04272011 Grab Water | 6271525 |
| W-33_04272011 Grab Water  | 6271526 |
| W-1_04272011 Grab Water   | 6271527 |
| W-34_04272011 Grab Water  | 6271528 |
| W-5_04262011 Grab Water   | 6271529 |
| W-9_04262011 Grab Water   | 6271530 |
| W-15_04262011 Grab Water  | 6271531 |
| W-25_04262011 Grab Water  | 6271532 |
| W-26_04262011 Grab Water  | 6271533 |
| W-27_04262011 Grab Water  | 6271534 |
| W-30_04262011 Grab Water  | 6271535 |
| W-2_04262011 Grab Water   | 6271536 |
| W-6_04262011 Grab Water   | 6271537 |
| W-11_04262011 Grab Water  | 6271538 |
| W-12_04262011 Grab Water  | 6271539 |
| W-13_04262011 Grab Water  | 6271540 |
| W-1D_04262011 Grab Water  | 6271541 |
| W-28_04262011 Grab Water  | 6271542 |
| W-29_04262011 Grab Water  | 6271543 |
| W-31_04262011 Grab Water  | 6271544 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

|                    |                      |                         |
|--------------------|----------------------|-------------------------|
| ELECTRONIC COPY TO | Langan               | Attn: Dennis Webster    |
| ELECTRONIC COPY TO | SUN: Aquaterra Tech. | Attn: Tiffani Doerr     |
| ELECTRONIC COPY TO | LLI                  | Attn: EDD Group         |
| ELECTRONIC COPY TO | Langan               | Attn: Kristen Ward      |
| ELECTRONIC COPY TO | Aquaterra Tech       | Attn: Loretta Belfiglio |

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Chad A. Moline  
Group Leader



**Sample Description:** W-16\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-16\_04272011

LLI Sample # WW 6271518  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 12:20 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1016

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | 0.6 J              | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | 26                 | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | 0.6 J              | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | 0.00018 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 05:01       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 05:01       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/01/2011 23:34       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 03:47       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:36       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-17\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-17\_04272011

**LLI Sample #** WW 6271519  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 12:10 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1017

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 0.9 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 0.6 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 43                 | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 0.9 J              | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 3                  | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 1 J                | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.000084 J         | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 05:28       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 05:28       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/01/2011 23:59       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 04:47       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:38       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-19\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-19\_04272011

**LLI Sample #** WW 6271520  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 09:35 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1019

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 0.9                                 | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 0.9                                 | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 0.9                                 | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 0.9                                 | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 0.9                                 | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 05:56       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 05:56       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 00:23       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 05:48       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:44       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-20\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-20\_04272011

LLI Sample # WW 6271521  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 09:10 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1020

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | 0.0032             | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 06:24       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 06:24       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 00:47       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 06:18       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:46       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-22\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-22\_04272011

**LLI Sample #** WW 6271522  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1022

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 2 J                | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.029                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00020 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 06:52       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 06:52       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11120WAF026   | 05/03/2011 09:59       | Brian K Graham      | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 06:48       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:48       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-23\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-23\_04272011

**LLI Sample #** WW 6271523  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 10:50 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1023

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 12                 | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 1                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 1 J                | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 2                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 8                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | 2                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 13                 | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 3 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111193AA     | 04/30/2011 07:20       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111193AA     | 04/30/2011 07:20       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11120WAF026   | 05/03/2011 10:25       | Brian K Graham      | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 08:18       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:49       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-32\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-32\_04272011

**LLI Sample #** WW 6271524  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1032

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 56                 | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | 2                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 1                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 8                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 1                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 6                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | 1 J                | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 4                  | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 4 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 12                 | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 24                 | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 13                 | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 6                  | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00037 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/29/2011 22:15       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/29/2011 22:15       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11120WAF026   | 05/03/2011 10:50       | Brian K Graham      | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 08:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:51       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-32D\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-32D\_04272011

LLI Sample # WW 6271525  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 13:20 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A102D

| CAT No.                                                                  | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|--------------------------------------------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>                                      |                             |            |                    |                                     |                                   |                 |
| 10943                                                                    | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                                                    | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                                                    | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                                                    | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                                                    | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                                                    | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                                                    | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                                                    | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                                                    | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b>                                  |                             |            |                    |                                     |                                   |                 |
| 07805                                                                    | Chrysene                    | 218-01-9   | N.D.               | ug/l 10                             | ug/l 50                           | 1               |
| 07805                                                                    | Fluorene                    | 86-73-7    | N.D.               | 10                                  | 50                                | 1               |
| 07805                                                                    | Naphthalene                 | 91-20-3    | N.D.               | 10                                  | 50                                | 1               |
| 07805                                                                    | Phenanthrene                | 85-01-8    | N.D.               | 10                                  | 50                                | 1               |
| 07805                                                                    | Pyrene                      | 129-00-0   | N.D.               | 10                                  | 50                                | 1               |
| Reporting limits were raised due to interference from the sample matrix. |                             |            |                    |                                     |                                   |                 |
| <b>GC Miscellaneous SW-846 8011</b>                                      |                             |            |                    |                                     |                                   |                 |
| 07879                                                                    | Ethylene dibromide          | 106-93-4   | N.D.               | ug/l 0.0094                         | ug/l 0.028                        | 1               |
| <b>Metals Dissolved SW-846 6020</b>                                      |                             |            |                    |                                     |                                   |                 |
| 06035                                                                    | Lead                        | 7439-92-1  | N.D.               | mg/l 0.000052                       | mg/l 0.0010                       | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst               | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|-----------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/29/2011 22:43       | Kevin A Sposito       | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/29/2011 22:43       | Kevin A Sposito       | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11124WAB026   | 05/05/2011 14:34       | Brian K Graham        | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 2      | 11124WAB026   | 05/04/2011 17:00       | Timothy J Attenberger | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 09:19       | Tyler O Griffin       | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz           | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:53       | Choon Y Tian          | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors      | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-33\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-33\_04272011

**LLI Sample #** WW 6271526  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/27/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/28/2011 16:55

West Chester PA 19381

**Reported:** 05/10/2011 10:53

A1033

| CAT No.      | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943        | Benzene                     | 71-43-2             | 250                | 5                                   | 10                                | 10              |
| 10943        | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 5                                   | 10                                | 10              |
| 10943        | Ethylbenzene                | 100-41-4            | 13                 | 5                                   | 10                                | 10              |
| 10943        | Isopropylbenzene            | 98-82-8             | N.D.               | 5                                   | 20                                | 10              |
| 10943        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 5                                   | 10                                | 10              |
| 10943        | Toluene                     | 108-88-3            | 60                 | 5                                   | 10                                | 10              |
| 10943        | 1,2,4-Trimethylbenzene      | 95-63-6             | 36                 | 5                                   | 20                                | 10              |
| 10943        | 1,3,5-Trimethylbenzene      | 108-67-8            | 11 J               | 5                                   | 20                                | 10              |
| 10943        | Xylene (Total)              | 1330-20-7           | 70                 | 5                                   | 10                                | 10              |

Reporting limits were raised due to sample foaming.

|              |                      |                     |             |             |             |   |
|--------------|----------------------|---------------------|-------------|-------------|-------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/l</b> | <b>ug/l</b> | <b>ug/l</b> |   |
| 07805        | Chrysene             | 218-01-9            | 6           | 1           | 5           | 1 |
| 07805        | Fluorene             | 86-73-7             | 36          | 1           | 5           | 1 |
| 07805        | Naphthalene          | 91-20-3             | 330         | 5           | 24          | 5 |
| 07805        | Phenanthrene         | 85-01-8             | 66          | 1           | 5           | 1 |
| 07805        | Pyrene               | 129-00-0            | 16          | 1           | 5           | 1 |

|           |                      |                    |             |             |             |   |
|-----------|----------------------|--------------------|-------------|-------------|-------------|---|
| <b>GC</b> | <b>Miscellaneous</b> | <b>SW-846 8011</b> | <b>ug/l</b> | <b>ug/l</b> | <b>ug/l</b> |   |
| 07879     | Ethylene dibromide   | 106-93-4           | N.D.        | 0.0094      | 0.028       | 1 |

|               |                  |                    |             |             |             |   |
|---------------|------------------|--------------------|-------------|-------------|-------------|---|
| <b>Metals</b> | <b>Dissolved</b> | <b>SW-846 6020</b> | <b>mg/l</b> | <b>mg/l</b> | <b>mg/l</b> |   |
| 06035         | Lead             | 7439-92-1          | 0.000068 J  | 0.000052    | 0.0010      | 1 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name             | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs | SW-846 8260B | 1      | D111232AA     | 05/03/2011 21:16       | Daniel H Heller     | 10              |
| 01163   | GC/MS VOA Water Prep      | SW-846 5030B | 1      | D111232AA     | 05/03/2011 21:16       | Daniel H Heller     | 10              |
| 07805   | PAHs by 8270              | SW-846 8270C | 1      | 11120WAF026   | 05/03/2011 11:40       | Brian K Graham      | 1               |
| 07805   | PAHs by 8270              | SW-846 8270C | 1      | 11120WAF026   | 05/03/2011 14:21       | Linda M Hartenstine | 5               |
| 07807   | BNA Water Extraction      | SW-846 3510C | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater         | SW-846 8011  | 1      | 111220024A    | 05/04/2011 09:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction            | SW-846 8011  | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                      | SW-846 6020  | 1      | 111226050002A | 05/04/2011 12:55       | Choon Y Tian        | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 2 of 2

**Sample Description:** W-33\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-33\_04272011

LLI Sample # WW 6271526  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 11:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/28/2011 16:55

PO Box 744

Reported: 05/10/2011 10:53

West Chester PA 19381

A1033

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|----------------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002 | 05/03/2011 08:53       | Denise K Conners | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-1\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-1\_04272011

**LLI Sample #** WW 6271527  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1001

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | 2                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 20                 | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 13                 | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 13                 | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 37                 | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/29/2011 23:11       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/29/2011 23:11       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11120WAF026   | 05/03/2011 12:05       | Brian K Graham      | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 10:19       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:58       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-34\_04272011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-34\_04272011

**LLI Sample #** WW 6271528  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/27/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1034

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 7                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 2                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 1 J                | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 11                 | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 9                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | 2                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 19                 | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 5 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 11                 | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 10                 | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 1 J                | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/29/2011 23:39       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/29/2011 23:39       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11120WAF026   | 05/03/2011 12:30       | Brian K Graham      | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11120WAF026   | 05/02/2011 09:15       | Cynthia J Salvatori | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 10:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:59       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-5\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-5\_04262011

**LLI Sample #** WW 6271529  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 11:50 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1005

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | 3                  | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.029                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111262AA     | 05/06/2011 18:45       | Nicholas R Rossi    | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111262AA     | 05/06/2011 18:45       | Nicholas R Rossi    | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 01:11       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 11:19       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:01       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-9\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-9\_04262011

**LLI Sample #** WW 6271530  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1009

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | ug/l                                | ug/l                              | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | ug/l                                | ug/l                              | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | ug/l                                | ug/l                              | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | ug/l                                | ug/l                              | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | ug/l                                | ug/l                              | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | ug/l                                | ug/l                              | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | ug/l                                | ug/l                              | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | ug/l                                | ug/l                              | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | mg/l                                | mg/l                              | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 00:35       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 00:35       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 01:36       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 11:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:07       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-15\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-15\_04262011

**LLI Sample #** WW 6271531  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 12:25 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1015

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 0.8 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 2 J                | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00096 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111262AA     | 05/06/2011 19:13       | Nicholas R Rossi    | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111262AA     | 05/06/2011 19:13       | Nicholas R Rossi    | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 02:00       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 12:19       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:09       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 1

**Sample Description:** W-25\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-25\_04262011

**LLI Sample #** WW 6271532  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/26/2011 13:55 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/28/2011 16:55

PO Box 744

**Reported:** 05/10/2011 10:53

West Chester PA 19381

A1025

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 01:31       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 01:31       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 02:24       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 12:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:11       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-26\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-26\_04262011

LLI Sample # WW 6271533  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 14:10 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1026

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | 0.6 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 01:59       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 01:59       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 02:48       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 14:19       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:13       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-27\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-27\_04262011

**LLI Sample #** WW 6271534  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 13:10 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/28/2011 16:55

Reported: 05/10/2011 10:53

A1027

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | 0.00011 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 02:27       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 02:27       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 03:13       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 14:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:15       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-30\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-30\_04262011

**LLI Sample #** WW 6271535  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 11:25 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1030

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00013 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 02:55       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 02:55       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 03:37       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 15:19       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:16       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-2\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-2\_04262011

**LLI Sample #** WW 6271536  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/26/2011 11:25 by MH

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/28/2011 16:55

West Chester PA 19381

**Reported:** 05/10/2011 10:53

A1002

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.029                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 03:23       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 03:23       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 04:01       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 15:49       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 13:18       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-6\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-6\_04262011

**LLI Sample #** WW 6271537  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 12:45 by MH

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1006

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | 0.000072 J         | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 03:51       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 03:51       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 04:26       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111220024A    | 05/04/2011 16:20       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111220024A    | 05/03/2011 10:15       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111226050002A | 05/04/2011 12:25       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111226050002  | 05/03/2011 08:53       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-11\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-11\_04262011

**LLI Sample #** WW 6271538  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 13:20 by MH

SUN: Aquaterra Tech.

Submitted: 04/28/2011 16:55

PO Box 744

Reported: 05/10/2011 10:53

West Chester PA 19381

A1011

| CAT No.       | Analysis Name               | CAS Number          | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---------------|-----------------------------|---------------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS</b>  | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 10943         | Benzene                     | 71-43-2             | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2-Dichloroethane          | 107-06-2            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Ethylbenzene                | 100-41-4            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Isopropylbenzene            | 98-82-8             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | Toluene                     | 108-88-3            | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943         | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943         | Xylene (Total)              | 1330-20-7           | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS</b>  | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07805         | Chrysene                    | 218-01-9            | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Fluorene                    | 86-73-7             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Naphthalene                 | 91-20-3             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Phenanthrene                | 85-01-8             | N.D.               | 1                                   | 5                                 | 1               |
| 07805         | Pyrene                      | 129-00-0            | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC</b>     | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>        | <b>ug/l</b>                         | <b>ug/l</b>                       |                 |
| 07879         | Ethylene dibromide          | 106-93-4            | N.D.               | 0.0094                              | 0.028                             | 1               |
| <b>Metals</b> | <b>Dissolved</b>            | <b>SW-846 6020</b>  | <b>mg/l</b>        | <b>mg/l</b>                         | <b>mg/l</b>                       |                 |
| 06035         | Lead                        | 7439-92-1           | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 04:19       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 04:19       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 12:40       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 20:20       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:48       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-12\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-12\_04262011

LLI Sample # WW 6271539  
LLI Group # 1244429  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 13:55 by MH

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/28/2011 16:55

Reported: 05/10/2011 10:53

A1012

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 8                  | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 3                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 2                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 1                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 4                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | 0.6 J              | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 10                 | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 1 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 2 J                | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.029                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00018 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 04:47       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 04:47       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 13:04       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 21:20       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:50       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-13\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-13\_04262011

**LLI Sample #** WW 6271540  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 14:15 by MH

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1013

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.029                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 05:15       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 05:15       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 13:28       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 22:21       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:52       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-1D\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-1D\_04262011

**LLI Sample #** WW 6271541  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 10:45 by MH

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A101D

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 0.8 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | N.D.               | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 05:43       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 05:43       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 13:52       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 22:51       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:54       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-28\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-28\_04262011

**LLI Sample #** WW 6271542  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 12:10 by MH

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/28/2011 16:55

Reported: 05/10/2011 10:53

A1028

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 0.5 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 23                 | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 0.8 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 1 J                | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 1                  | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 2 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 12                 | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 3 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 21                 | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 8                  | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | 0.0095                              | 0.028                             | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | 0.00019 J          | 0.000052                            | 0.0010                            | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 06:11       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 06:11       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 14:17       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 23:21       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:56       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-29\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-29\_04262011

**LLI Sample #** WW 6271543  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 11:05 by MH

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1029

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | N.D.               | ug/l 0.5                            | ug/l 1                            | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | 0.6 J              | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | N.D.               | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | N.D.               | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | N.D.               | ug/l 0.9                            | ug/l 5                            | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 1 J                | 0.9                                 | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | N.D.               | 0.9                                 | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 2 J                | 0.9                                 | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | N.D.               | 0.9                                 | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | ug/l 0.0094                         | ug/l 0.028                        | 1               |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | N.D.               | mg/l 0.000052                       | mg/l 0.0010                       | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 06:39       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 06:39       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 14:41       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/04/2011 23:51       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:57       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-31\_04262011 Grab Water  
Philadelphia Refinery AOI-10  
COC: 238116 W-31\_04262011

**LLI Sample #** WW 6271544  
**LLI Group #** 1244429  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/26/2011 15:15 by MH

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/28/2011 16:55

West Chester PA 19381

Reported: 05/10/2011 10:53

A1031

| CAT No.                                 | Analysis Name               | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|-----------------------------------------|-----------------------------|------------|--------------------|-------------------------------------|-----------------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>     |                             |            |                    |                                     |                                   |                 |
| 10943                                   | Benzene                     | 71-43-2    | 10                 | ug/l                                | ug/l                              | 1               |
| 10943                                   | 1,2-Dichloroethane          | 107-06-2   | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Ethylbenzene                | 100-41-4   | 5                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | Isopropylbenzene            | 98-82-8    | 9                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.               | 0.5                                 | 1                                 | 1               |
| 10943                                   | Toluene                     | 108-88-3   | 4                  | 0.5                                 | 1                                 | 1               |
| 10943                                   | 1,2,4-Trimethylbenzene      | 95-63-6    | 28                 | 0.5                                 | 2                                 | 1               |
| 10943                                   | 1,3,5-Trimethylbenzene      | 108-67-8   | 9                  | 0.5                                 | 2                                 | 1               |
| 10943                                   | Xylene (Total)              | 1330-20-7  | 21                 | 0.5                                 | 1                                 | 1               |
| <b>GC/MS Semivolatiles SW-846 8270C</b> |                             |            |                    |                                     |                                   |                 |
| 07805                                   | Chrysene                    | 218-01-9   | 4 J                | ug/l                                | ug/l                              | 1               |
| 07805                                   | Fluorene                    | 86-73-7    | 5 J                | 1                                   | 5                                 | 1               |
| 07805                                   | Naphthalene                 | 91-20-3    | 13                 | 1                                   | 5                                 | 1               |
| 07805                                   | Phenanthrene                | 85-01-8    | 17                 | 1                                   | 5                                 | 1               |
| 07805                                   | Pyrene                      | 129-00-0   | 9                  | 1                                   | 5                                 | 1               |
| <b>GC Miscellaneous SW-846 8011</b>     |                             |            |                    |                                     |                                   |                 |
| 07879                                   | Ethylene dibromide          | 106-93-4   | N.D.               | ug/l                                | ug/l                              | 1               |
|                                         |                             |            |                    | 0.0095                              | 0.028                             |                 |
| <b>Metals Dissolved SW-846 6020</b>     |                             |            |                    |                                     |                                   |                 |
| 06035                                   | Lead                        | 7439-92-1  | mg/l               | mg/l                                | mg/l                              | 1               |
|                                         |                             |            | 0.0060             | 0.000052                            | 0.0010                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name              | Method                | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|----------------------------|-----------------------|--------|---------------|------------------------|---------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs  | SW-846 8260B          | 1      | P111194AA     | 04/30/2011 07:06       | Kevin A Sposito     | 1               |
| 01163   | GC/MS VOA Water Prep       | SW-846 5030B          | 1      | P111194AA     | 04/30/2011 07:06       | Kevin A Sposito     | 1               |
| 07805   | PAHs by 8270               | SW-846 8270C          | 1      | 11119WAA026   | 05/02/2011 15:05       | Linda M Hartenstine | 1               |
| 07807   | BNA Water Extraction       | SW-846 3510C          | 1      | 11119WAA026   | 04/30/2011 09:20       | Joseph S Feister    | 1               |
| 07879   | EDB in Wastewater          | SW-846 8011           | 1      | 111240001A    | 05/05/2011 00:21       | Tyler O Griffin     | 1               |
| 07786   | EDB Extraction             | SW-846 8011           | 1      | 111240001A    | 05/04/2011 11:10       | Edwin Ortiz         | 1               |
| 06035   | Lead                       | SW-846 6020           | 1      | 111236050002A | 05/04/2011 16:59       | Choon Y Tian        | 1               |
| 06050   | ICP/MS SW-846 Water Digest | SW-846 3010A modified | 1      | 111236050002  | 05/04/2011 09:00       | Denise K Connors    | 1               |

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                                                                        | Blank Result | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|------------------------------------------------------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: D111232AA Sample number(s): 6271526                                                    |              |             |           |              |          |           |                 |     |         |
| Benzene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 95       |           | 79-120          |     |         |
| 1,2-Dichloroethane                                                                                   | N.D.         | 0.5         | 1         | ug/l         | 96       |           | 70-130          |     |         |
| Ethylbenzene                                                                                         | N.D.         | 0.5         | 1         | ug/l         | 95       |           | 79-120          |     |         |
| Isopropylbenzene                                                                                     | N.D.         | 0.5         | 2         | ug/l         | 95       |           | 77-120          |     |         |
| Methyl Tertiary Butyl Ether                                                                          | N.D.         | 0.5         | 1         | ug/l         | 91       |           | 76-120          |     |         |
| Toluene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 97       |           | 79-120          |     |         |
| 1,2,4-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 92       |           | 74-120          |     |         |
| 1,3,5-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 94       |           | 75-120          |     |         |
| Xylene (Total)                                                                                       | N.D.         | 0.5         | 1         | ug/l         | 96       |           | 80-120          |     |         |
| Batch number: P111193AA Sample number(s): 6271518-6271523                                            |              |             |           |              |          |           |                 |     |         |
| Benzene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 93       | 93        | 79-120          | 0   | 30      |
| 1,2-Dichloroethane                                                                                   | N.D.         | 0.5         | 1         | ug/l         | 75       | 75        | 70-130          | 1   | 30      |
| Ethylbenzene                                                                                         | N.D.         | 0.5         | 1         | ug/l         | 89       | 88        | 79-120          | 2   | 30      |
| Isopropylbenzene                                                                                     | N.D.         | 0.5         | 2         | ug/l         | 86       | 86        | 77-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                                                          | N.D.         | 0.5         | 1         | ug/l         | 99       | 100       | 76-120          | 1   | 30      |
| Toluene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 91       | 89        | 79-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 90       | 89        | 74-120          | 1   | 30      |
| 1,3,5-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 91       | 91        | 75-120          | 0   | 30      |
| Xylene (Total)                                                                                       | N.D.         | 0.5         | 1         | ug/l         | 88       | 87        | 80-120          | 2   | 30      |
| Batch number: P111194AA Sample number(s): 6271524-6271525, 6271527-6271528, 6271530, 6271532-6271544 |              |             |           |              |          |           |                 |     |         |
| Benzene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 98       | 98        | 79-120          | 0   | 30      |
| 1,2-Dichloroethane                                                                                   | N.D.         | 0.5         | 1         | ug/l         | 78       | 78        | 70-130          | 0   | 30      |
| Ethylbenzene                                                                                         | N.D.         | 0.5         | 1         | ug/l         | 94       | 94        | 79-120          | 1   | 30      |
| Isopropylbenzene                                                                                     | N.D.         | 0.5         | 2         | ug/l         | 92       | 92        | 77-120          | 0   | 30      |
| Methyl Tertiary Butyl Ether                                                                          | N.D.         | 0.5         | 1         | ug/l         | 99       | 97        | 76-120          | 2   | 30      |
| Toluene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 96       | 97        | 79-120          | 1   | 30      |
| 1,2,4-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 94       | 95        | 74-120          | 1   | 30      |
| 1,3,5-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 96       | 99        | 75-120          | 3   | 30      |
| Xylene (Total)                                                                                       | N.D.         | 0.5         | 1         | ug/l         | 93       | 93        | 80-120          | 0   | 30      |
| Batch number: P111262AA Sample number(s): 6271529, 6271531                                           |              |             |           |              |          |           |                 |     |         |
| Benzene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 97       | 98        | 79-120          | 2   | 30      |
| 1,2-Dichloroethane                                                                                   | N.D.         | 0.5         | 1         | ug/l         | 80       | 80        | 70-130          | 1   | 30      |
| Ethylbenzene                                                                                         | N.D.         | 0.5         | 1         | ug/l         | 93       | 93        | 79-120          | 1   | 30      |
| Isopropylbenzene                                                                                     | N.D.         | 0.5         | 2         | ug/l         | 91       | 90        | 77-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                                                          | N.D.         | 0.5         | 1         | ug/l         | 100      | 101       | 76-120          | 1   | 30      |
| Toluene                                                                                              | N.D.         | 0.5         | 1         | ug/l         | 95       | 94        | 79-120          | 1   | 30      |
| 1,2,4-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 92       | 91        | 74-120          | 1   | 30      |
| 1,3,5-Trimethylbenzene                                                                               | N.D.         | 0.5         | 2         | ug/l         | 95       | 93        | 75-120          | 3   | 30      |
| Xylene (Total)                                                                                       | N.D.         | 0.5         | 1         | ug/l         | 92       | 91        | 80-120          | 2   | 30      |
| Batch number: 11119WAA026 Sample number(s): 6271518-6271521, 6271529-6271544                         |              |             |           |              |          |           |                 |     |         |
| Chrysene                                                                                             | N.D.         | 1.          | 5         | ug/l         | 96       | 94        | 82-112          | 2   | 30      |
| Fluorene                                                                                             | N.D.         | 1.          | 5         | ug/l         | 97       | 94        | 82-113          | 3   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

| <u>Analysis Name</u>                                                         | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------------------------------------------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Naphthalene                                                                  | N.D.                | 1.                 | 5                | ug/l                | 92              | 94               | 77-107                 | 2          | 30             |
| Phenanthrene                                                                 | N.D.                | 1.                 | 5                | ug/l                | 98              | 95               | 83-112                 | 3          | 30             |
| Pyrene                                                                       | N.D.                | 1.                 | 5                | ug/l                | 99              | 94               | 80-115                 | 5          | 30             |
| Batch number: 11120WAF026 Sample number(s): 6271522-6271524, 6271526-6271528 |                     |                    |                  |                     |                 |                  |                        |            |                |
| Chrysene                                                                     | N.D.                | 1.                 | 5                | ug/l                | 97              | 94               | 82-112                 | 3          | 30             |
| Fluorene                                                                     | N.D.                | 1.                 | 5                | ug/l                | 99              | 98               | 82-113                 | 1          | 30             |
| Naphthalene                                                                  | N.D.                | 1.                 | 5                | ug/l                | 94              | 95               | 77-107                 | 0          | 30             |
| Phenanthrene                                                                 | N.D.                | 1.                 | 5                | ug/l                | 97              | 97               | 83-112                 | 0          | 30             |
| Pyrene                                                                       | N.D.                | 1.                 | 5                | ug/l                | 97              | 98               | 80-115                 | 1          | 30             |
| Batch number: 11124WAB026 Sample number(s): 6271525                          |                     |                    |                  |                     |                 |                  |                        |            |                |
| Chrysene                                                                     | N.D.                | 1.                 | 5                | ug/l                | 95              | 97               | 82-112                 | 3          | 30             |
| Fluorene                                                                     | N.D.                | 1.                 | 5                | ug/l                | 97              | 97               | 82-113                 | 1          | 30             |
| Naphthalene                                                                  | N.D.                | 1.                 | 5                | ug/l                | 93              | 95               | 77-107                 | 3          | 30             |
| Phenanthrene                                                                 | N.D.                | 1.                 | 5                | ug/l                | 94              | 97               | 83-112                 | 4          | 30             |
| Pyrene                                                                       | N.D.                | 1.                 | 5                | ug/l                | 99              | 101              | 80-115                 | 3          | 30             |
| Batch number: 111220024A Sample number(s): 6271518-6271537                   |                     |                    |                  |                     |                 |                  |                        |            |                |
| Ethylene dibromide                                                           | N.D.                | 0.010              | 0.030            | ug/l                | 96              | 96               | 60-140                 | 0          | 20             |
| Batch number: 111240001A Sample number(s): 6271538-6271544                   |                     |                    |                  |                     |                 |                  |                        |            |                |
| Ethylene dibromide                                                           | N.D.                | 0.010              | 0.030            | ug/l                | 96              | 96               | 60-140                 | 0          | 20             |
| Batch number: 111226050002A Sample number(s): 6271518-6271537                |                     |                    |                  |                     |                 |                  |                        |            |                |
| Lead                                                                         | N.D.                | 0.00005            | 0.0010           | mg/l                | 101             |                  | 90-115                 |            |                |
|                                                                              |                     | 2                  |                  |                     |                 |                  |                        |            |                |
| Batch number: 111236050002A Sample number(s): 6271538-6271544                |                     |                    |                  |                     |                 |                  |                        |            |                |
| Lead                                                                         | N.D.                | 0.00005            | 0.0010           | mg/l                | 102             |                  | 90-115                 |            |                |
|                                                                              |                     | 2                  |                  |                     |                 |                  |                        |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>                                                                   | <u>MS %REC</u> | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|----------------------------------------------------------------------------------------|----------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: D111232AA Sample number(s): 6271526 UNSPK: P272733                       |                |                 |                      |            |                |                 |                 |                |                    |
| Benzene                                                                                | 95             | 88              | 80-126               | 6          | 30             |                 |                 |                |                    |
| 1,2-Dichloroethane                                                                     | 96             | 87              | 66-141               | 10         | 30             |                 |                 |                |                    |
| Ethylbenzene                                                                           | 97             | 92              | 71-134               | 5          | 30             |                 |                 |                |                    |
| Isopropylbenzene                                                                       | 102            | 96              | 75-128               | 6          | 30             |                 |                 |                |                    |
| Methyl Tertiary Butyl Ether                                                            | 93             | 85              | 72-126               | 9          | 30             |                 |                 |                |                    |
| Toluene                                                                                | 104            | 96              | 80-125               | 8          | 30             |                 |                 |                |                    |
| 1,2,4-Trimethylbenzene                                                                 | 89             | 85              | 72-130               | 2          | 30             |                 |                 |                |                    |
| 1,3,5-Trimethylbenzene                                                                 | 104            | 95              | 72-131               | 7          | 30             |                 |                 |                |                    |
| Xylene (Total)                                                                         | 85             | 84              | 79-125               | 0          | 30             |                 |                 |                |                    |
| Batch number: 111220024A Sample number(s): 6271518-6271537 UNSPK: 6271518 BKG: 6271519 |                |                 |                      |            |                |                 |                 |                |                    |
| Ethylene dibromide                                                                     | 74             |                 | 65-135               |            |                | N.D.            | N.D.            | 0 (1)          | 30                 |
| Batch number: 111240001A Sample number(s): 6271538-6271544 UNSPK: 6271538 BKG: 6271539 |                |                 |                      |            |                |                 |                 |                |                    |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS</u><br><u>%REC</u>                                      | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup</u> <u>RPD</u><br><u>Max</u> |
|-----------------------------|---------------------------------------------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|-------------------------------------|
| Ethylene dibromide          | 77                                                            |                           | 65-135                         |            |                          | N.D.                      | N.D.                      | 0 (1)                    | 30                                  |
| Batch number: 111226050002A | Sample number(s): 6271518-6271537 UNSPK: 6271537 BKG: 6271537 |                           |                                |            |                          |                           |                           |                          |                                     |
| Lead                        | 103                                                           | 107                       | 83-120                         | 3          | 20                       | 0.000072 J                | 0.000057 J                | 23* (1)                  | 20                                  |
| Batch number: 111236050002A | Sample number(s): 6271538-6271544 UNSPK: P272075 BKG: P272075 |                           |                                |            |                          |                           |                           |                          |                                     |
| Lead                        | 104                                                           | 106                       | 83-120                         | 2          | 20                       | 0.000085 J                | 0.000074 J                | 14 (1)                   | 20                                  |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: UST BTEX, MTBE in Water  
Batch number: D111232AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6271526 | 90                   | 94                    | 100        | 99                   |
| Blank   | 92                   | 96                    | 100        | 98                   |
| LCS     | 91                   | 97                    | 100        | 105                  |
| MS      | 89                   | 99                    | 101        | 105                  |
| MSD     | 91                   | 98                    | 102        | 107                  |
| Limits: | 80-116               | 77-113                | 80-113     | 78-113               |

Analysis Name: UST BTEX, MTBE in Water  
Batch number: P111193AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6271518 | 96                   | 96                    | 99         | 91                   |
| 6271519 | 94                   | 97                    | 99         | 94                   |
| 6271520 | 95                   | 96                    | 98         | 90                   |
| 6271521 | 95                   | 97                    | 99         | 90                   |
| 6271522 | 95                   | 98                    | 98         | 89                   |
| 6271523 | 96                   | 98                    | 98         | 92                   |
| Blank   | 94                   | 95                    | 99         | 90                   |
| LCS     | 94                   | 99                    | 98         | 92                   |
| LCSD    | 96                   | 97                    | 97         | 92                   |
| Limits: | 80-116               | 77-113                | 80-113     | 78-113               |

Analysis Name: UST BTEX, MTBE in Water  
Batch number: P111194AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6271524 | 93                   | 97                    | 93         | 92                   |
| 6271525 | 95                   | 94                    | 96         | 93                   |
| 6271527 | 94                   | 96                    | 94         | 90                   |
| 6271528 | 93                   | 94                    | 95         | 91                   |
| 6271530 | 93                   | 95                    | 95         | 91                   |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

### Surrogate Quality Control

|         |    |    |    |    |
|---------|----|----|----|----|
| 6271532 | 94 | 95 | 95 | 91 |
| 6271533 | 95 | 96 | 94 | 91 |
| 6271534 | 93 | 97 | 94 | 90 |
| 6271535 | 93 | 97 | 95 | 89 |
| 6271536 | 93 | 94 | 96 | 89 |
| 6271537 | 94 | 95 | 94 | 89 |
| 6271538 | 94 | 96 | 95 | 89 |
| 6271539 | 93 | 94 | 94 | 91 |
| 6271540 | 94 | 98 | 94 | 90 |
| 6271541 | 93 | 97 | 95 | 88 |
| 6271542 | 93 | 94 | 93 | 91 |
| 6271543 | 94 | 94 | 95 | 92 |
| 6271544 | 94 | 95 | 94 | 93 |
| Blank   | 94 | 97 | 95 | 90 |
| LCS     | 94 | 97 | 94 | 91 |
| LCSD    | 93 | 97 | 94 | 90 |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 80-116 | 77-113 | 80-113 | 78-113 |
|---------|--------|--------|--------|--------|

Analysis Name: UST BTEX, MTBE in Water

Batch number: P111262AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6271529 | 94                   | 98                    | 93         | 90                   |
| 6271531 | 95                   | 95                    | 92         | 88                   |
| Blank   | 95                   | 100                   | 93         | 91                   |
| LCS     | 93                   | 96                    | 92         | 91                   |
| LCSD    | 94                   | 97                    | 94         | 91                   |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 80-116 | 77-113 | 80-113 | 78-113 |
|---------|--------|--------|--------|--------|

Analysis Name: PAHs by 8270

Batch number: 11119WAA026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6271518 | 102             | 97               | 95            |
| 6271519 | 97              | 94               | 94            |
| 6271520 | 102             | 97               | 95            |
| 6271521 | 98              | 94               | 92            |
| 6271529 | 99              | 93               | 92            |
| 6271530 | 98              | 94               | 93            |
| 6271531 | 97              | 95               | 91            |
| 6271532 | 96              | 92               | 93            |
| 6271533 | 97              | 94               | 91            |
| 6271534 | 97              | 92               | 92            |
| 6271535 | 99              | 96               | 95            |
| 6271536 | 101             | 97               | 93            |
| 6271537 | 96              | 93               | 92            |
| 6271538 | 96              | 84               | 76            |
| 6271539 | 96              | 92               | 94            |
| 6271540 | 97              | 90               | 89            |
| 6271541 | 98              | 90               | 94            |
| 6271542 | 96              | 92               | 96            |
| 6271543 | 97              | 94               | 97            |
| 6271544 | 103             | 95               | 95            |
| Blank   | 101             | 98               | 91            |
| LCS     | 100             | 95               | 92            |
| LCSD    | 98              | 93               | 88            |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

### Surrogate Quality Control

Limits: 52-120 63-114 34-118

Analysis Name: PAHs by 8270

Batch number: 11120WAF026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6271522 | 93              | 99               | 89            |
| 6271523 | 96              | 95               | 90            |
| 6271524 | 89              | 86               | 80            |
| 6271526 | 94              | 97               | 89            |
| 6271527 | 99              | 98               | 91            |
| 6271528 | 95              | 99               | 94            |
| Blank   | 95              | 96               | 92            |
| LCS     | 96              | 99               | 95            |
| LCSD    | 95              | 99               | 96            |

Limits: 52-120 63-114 34-118

Analysis Name: PAHs by 8270

Batch number: 11124WAB026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6271525 | 88              | 89               | 76            |
| Blank   | 94              | 94               | 87            |
| LCS     | 96              | 97               | 92            |
| LCSD    | 97              | 97               | 92            |

Limits: 52-120 63-114 34-118

Analysis Name: EDB in Wastewater

Batch number: 111220024A

1,1,2,2-  
Tetrachloroethane

|         |     |
|---------|-----|
| 6271518 | 79  |
| 6271519 | 84  |
| 6271520 | 82  |
| 6271521 | 76  |
| 6271522 | 88  |
| 6271523 | 116 |
| 6271524 | 109 |
| 6271525 | 91  |
| 6271526 | 94  |
| 6271527 | 88  |
| 6271528 | 107 |
| 6271529 | 87  |
| 6271530 | 80  |
| 6271531 | 82  |
| 6271532 | 81  |
| 6271533 | 88  |
| 6271534 | 83  |
| 6271535 | 82  |
| 6271536 | 83  |
| 6271537 | 86  |
| Blank   | 103 |
| DUP     | 94  |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/10/11 at 10:53 AM

Group Number: 1244429

## Surrogate Quality Control

LCS 103  
LCSD 102  
MS 89

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Limits: 46-136

Analysis Name: EDB in Wastewater  
Batch number: 111240001A  
1,1,2,2-  
Tetrachloroethane

---

6271538 75  
6271539 126  
6271540 79  
6271541 79  
6271542 86  
6271543 84  
6271544 129  
Blank 99  
DUP 128  
LCS 102  
LCSD 102  
MS 77

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Limits: 46-136

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.  
(2) The unspiked result was more than four times the spike added.

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1244429 Sample # 6271518-44 **COC # 238116**

Please print. Instructions on reverse side correspond with circled numbers.

Cooler temp 0.9-3.6°C

|                                                                                                                                                                                                                                                                                                                                               |  |  |  |                                                                                                                               |  |                                                          |  |                                     |  |                          |  |                                     |  |                                                                                                                                                                          |  |                                                                                                                             |  |                                       |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------|--|-------------------------------------|--|--------------------------|--|-------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------|--|--|--|--|--|--|--|--|--|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF AOE-X</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES / M. HINDER</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                                              |  |  |  | <b>Matrix</b><br>Check if Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Applicable <input type="checkbox"/> |  | <b>5</b> Analyses Requested<br><b>Preservation Codes</b> |  |                                     |  |                          |  |                                     |  |                                                                                                                                                                          |  | <b>6</b> Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |  |                                       |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                               |  |  |  |                                                                                                                               |  | <b>4</b> Total # of Containers                           |  |                                     |  |                          |  |                                     |  |                                                                                                                                                                          |  |                                                                                                                             |  |                                       |  |  |  |  |  |  |  |  |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                                                                |  |  |  | <b>3</b> Composite                                                                                                            |  | Soil                                                     |  | Water                               |  | Other                    |  | Total # of Containers               |  | Remarks                                                                                                                                                                  |  |                                                                                                                             |  |                                       |  |  |  |  |  |  |  |  |  |
| Date Collected                                                                                                                                                                                                                                                                                                                                |  |  |  | Time Collected                                                                                                                |  | Grab                                                     |  | Composite                           |  | Soil                     |  | Water                               |  | Other                                                                                                                                                                    |  | Total # of Containers                                                                                                       |  | Remarks                               |  |  |  |  |  |  |  |  |  |
| <u>W-16-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1220</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  | <u>See attached list for analyses</u> |  |  |  |  |  |  |  |  |  |
| <u>W-17-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1210</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-19-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>935</u>                                               |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-20-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>910</u>                                               |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-22-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1040</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-23-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1050</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-32-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1300</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-32D-04272011</u>                                                                                                                                                                                                                                                                                                                         |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1320</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-33-04272011</u>                                                                                                                                                                                                                                                                                                                          |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1100</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <u>W-1-04272011</u>                                                                                                                                                                                                                                                                                                                           |  |  |  | <u>4/27/11</u>                                                                                                                |  | <u>1430</u>                                              |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |  | <input checked="" type="checkbox"/> |  | <input type="checkbox"/>                                                                                                                                                 |  | <u>8</u>                                                                                                                    |  |                                       |  |  |  |  |  |  |  |  |  |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): Normal Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____                                     |  |  |  |                                                                                                                               |  |                                                          |  |                                     |  |                          |  |                                     |  | Relinquished by: <u>[Signature]</u> / <u>4/28/11</u><br>Date <u>4/28/11</u> Time <u>0900</u><br>Received by: <u>Sample Fribe</u><br>Date <u>4/28/11</u> Time <u>0900</u> |  |                                                                                                                             |  | <b>9</b>                              |  |  |  |  |  |  |  |  |  |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No<br>Type IV (CLP SOW) (if yes indicate QC sample and submit triplicate volume)<br>Type VI (Raw Data Only) Internal COC Required? Yes / No |  |  |  |                                                                                                                               |  |                                                          |  |                                     |  |                          |  |                                     |  | Relinquished by: <u>[Signature]</u> / <u>4/28/11</u><br>Date <u>4/28/11</u> Time <u>1000</u><br>Received by: <u>[Signature]</u> / <u>4/28/11</u> Time <u>1000</u>        |  |                                                                                                                             |  |                                       |  |  |  |  |  |  |  |  |  |
| Relinquished by: <u>[Signature]</u> / <u>4/28/11</u><br>Date <u>4/28/11</u> Time <u>1655</u><br>Received by: <u>[Signature]</u> / <u>4/28/11</u> Time <u>1655</u>                                                                                                                                                                             |  |  |  |                                                                                                                               |  |                                                          |  |                                     |  |                          |  |                                     |  |                                                                                                                                                                          |  |                                                                                                                             |  |                                       |  |  |  |  |  |  |  |  |  |



**Lancaster  
Laboratories**

Acct. # 10132 Group# 1244429 Sample # 6271518-44

**COC # 241185**

Please print. Instructions on reverse side correspond with circled numbers.

Cooler temp  $0.9 - 3.6^{\circ}\text{C}$ [illegible]





# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1244429 Sample # 6271518-44

**COC #** 232884

Please print. Instructions on reverse side correspond with circled numbers.

cooler temp 0.9-3.6 °C

For Lab Use Only

FSC:

SCR#:

**Preservation Codes**

H=HCl T=Thiosulfate

N=HNO<sub>3</sub> B=NaOH

S=H<sub>2</sub>SO<sub>4</sub> O=Other

1 Client: Agutella Acct. #: \_\_\_\_\_  
 Project Name/#: PHILA. Ref. AOI-10 PWSID #: \_\_\_\_\_  
 Project Manager: T. Doer P.O.#: \_\_\_\_\_  
 Sampler: Mike Hinderling Quote #: \_\_\_\_\_  
 Name of state where samples were collected: PA

| 2                     |  | 3              |                | 4     |           | 5    |       | 6     |            | 7    |         | 8             |               | 9               |                 | 10        |          | 11          |        | 12      |                | 13 |  | 14 |  | 15 |  | 16 |  | 17 |  | 18 |  | 19 |  | 20 |  | 21 |  | 22 |  | 23 |  | 24 |  | 25 |  | 26 |  | 27 |  | 28 |  | 29 |  | 30 |  | 31 |  | 32 |  | 33 |  | 34 |  | 35 |  | 36 |  | 37 |  | 38 |  | 39 |  | 40 |  | 41 |  | 42 |  | 43 |  | 44 |  | 45 |  | 46 |  | 47 |  | 48 |  | 49 |  | 50 |  | 51 |  | 52 |  | 53 |  | 54 |  | 55 |  | 56 |  | 57 |  | 58 |  | 59 |  | 60 |  | 61 |  | 62 |  | 63 |  | 64 |  | 65 |  | 66 |  | 67 |  | 68 |  | 69 |  | 70 |  | 71 |  | 72 |  | 73 |  | 74 |  | 75 |  | 76 |  | 77 |  | 78 |  | 79 |  | 80 |  | 81 |  | 82 |  | 83 |  | 84 |  | 85 |  | 86 |  | 87 |  | 88 |  | 89 |  | 90 |  | 91 |  | 92 |  | 93 |  | 94 |  | 95 |  | 96 |  | 97 |  | 98 |  | 99 |  | 100 |  |
|-----------------------|--|----------------|----------------|-------|-----------|------|-------|-------|------------|------|---------|---------------|---------------|-----------------|-----------------|-----------|----------|-------------|--------|---------|----------------|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|----|--|-----|--|
| Sample Identification |  | Date Collected | Time Collected | Grain | Composite | Soil | Water | Other | Total # of | Lead | Benzene | Ethyl Benzene | Ethyl Benzene | Xylenes (m,p,o) | Xylenes (o,p,m) | 1,3,5 Tri | Chrysene | Naphthalene | Pyrene | Remarks |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-2 - 04262011        |  | 4/26/11        | 1125           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-6 - 04262011        |  | 4/26/11        | 1245           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         | *List attached |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-11 - 04262011       |  | 4/26/11        | 1320           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-12 - 04262011       |  | 4/26/11        | 1355           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-13 - 04262011       |  | 4/26/11        | 1415           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-1D - 04262011       |  | 4/26/11        | 1045           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-28 - 04262011       |  | 4/26/11        | 1210           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-29 - 04262011       |  | 4/26/11        | 1105           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |
| W-31 - 04262011       |  | 4/26/11        | 1515           | X     |           |      | X     |       | 8          | X    | X       | X             | X             | X               | X               | X         | X        | X           | X      |         |                |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |

acct# 10132 Cyp# 1244429  
sample# 6271518-44

**Table 1a**  
**Constituents of Concern for Groundwater**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>METALS</b>    | <b>CAS No.</b> |
|------------------|----------------|
| Lead (dissolved) | 7439-92-1      |

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane                | 107-06-2       |
| 1,2,4-Trimethylbenzene            | 95-63-6        |
| 1,3,5-Trimethylbenzene            | 108-67-8       |
| Benzene                           | 71-43-2        |
| Cumene                            | 98-82-8        |
| Ethylbenzene                      | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether       | 1634-04-4      |
| Toluene                           | 108-88-3       |
| Xylenes (total)                   | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.
2. Select groundwater samples to be collected within the CAMU will be analyzed for full TCL VOCs, TCL SVOCs, and TAL metals.



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

| Organic Qualifiers |                                                                           | Inorganic Qualifiers |                                                         |
|--------------------|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------|
| <b>A</b>           | TIC is a possible aldol-condensation product                              | <b>B</b>             | Value is $<$ CRDL, but $\geq$ IDL                       |
| <b>B</b>           | Analyte was also detected in the blank                                    | <b>E</b>             | Estimated due to interference                           |
| <b>C</b>           | Pesticide result confirmed by GC/MS                                       | <b>M</b>             | Duplicate injection precision not met                   |
| <b>D</b>           | Compound quantitated on a diluted sample                                  | <b>N</b>             | Spike sample not within control limits                  |
| <b>E</b>           | Concentration exceeds the calibration range of the instrument             | <b>S</b>             | Method of standard additions (MSA) used for calculation |
| <b>N</b>           | Presumptive evidence of a compound (TICs only)                            | <b>U</b>             | Compound was not detected                               |
| <b>P</b>           | Concentration difference between primary and confirmation columns $>25\%$ | <b>W</b>             | Post digestion spike out of control limits              |
| <b>U</b>           | Compound was not detected                                                 | <b>*</b>             | Duplicate analysis not within control limits            |
| <b>X,Y,Z</b>       | Defined in case narrative                                                 | <b>+</b>             | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

May 05, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/25/2011  
Group Number: 1243735  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample Description

BH-10-59\_0-2' Grab Soil

Lancaster Labs (LLI) #

6267997

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC      Langan

Attn: Dennis Webster

COPY TO

ELECTRONIC      SUN: Aquaterra Tech.

Attn: Tiffani Doerr

COPY TO

ELECTRONIC      LLI

Attn: EDD Group

COPY TO

ELECTRONIC      Langan

Attn: Kristen Ward

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ELECTRONIC      Aquaterra Tech

Attn: Loretta Belfiglio

COPY TO

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Chad A. Moline  
Group Leader



**Sample Description:** BH-10-59\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259433 BH-10-59\_0-2'

LLI Sample # SW 6267997  
LLI Group # 1243735  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-59

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 12           | 6                          | 0.6                        | 0.98            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.98            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.98            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.98            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.98            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.98            |
| 10950        | Toluene                     | 108-88-3            | 6            | 6                          | 1                          | 0.98            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 6          | 6                          | 1                          | 0.98            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 6          | 6                          | 1                          | 0.98            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 6          | 6                          | 1                          | 0.98            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |    |
|--------------|----------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10724        | Anthracene           | 120-12-7            | < 2,000      | 2,000        | 410          | 10 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 2,100        | 2,000        | 410          | 10 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 2,000      | 2,000        | 410          | 10 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 2,100        | 2,000        | 410          | 10 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 2,000      | 2,000        | 410          | 10 |
| 10724        | Chrysene             | 218-01-9            | 2,300        | 2,000        | 410          | 10 |
| 10724        | Fluorene             | 86-73-7             | < 2,000      | 2,000        | 410          | 10 |
| 10724        | Naphthalene          | 91-20-3             | < 2,000      | 2,000        | 410          | 10 |
| 10724        | Phenanthrene         | 85-01-8             | 4,100        | 2,000        | 410          | 10 |
| 10724        | Pyrene               | 129-00-0            | 3,900        | 2,000        | 410          | 10 |

Reporting limits were raised due to interference from the sample matrix.

The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 401          | 1.17         | 0.0606       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 18.3     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 2 of 2

**Sample Description:** BH-10-59\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259433 BH-10-59\_0-2'

**LLI Sample #** SW 6267997  
**LLI Group #** 1243735  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/22/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/25/2011 15:50

West Chester PA 19381

**Reported:** 05/05/2011 18:45

10-59

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111191AA     | 04/29/2011 10:42       | Emily R Styer    | 0.98            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 10:30       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 10:30       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 10:30       | Client Supplied  | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11118SLE026   | 05/04/2011 10:32       | Brian K Graham   | 10              |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11118SLE026   | 04/29/2011 03:35       | Roman Kuropatkin | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:31       | Choon Y Tian     | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz    | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243735

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name               | Blank Result              | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------|---------------------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: X111191AA     | Sample number(s): 6267997 |             |           |              |          |           |                 |     |         |
| Benzene                     | < 5                       | 5.          | 0.5       | ug/kg        | 95       |           | 80-120          |     |         |
| 1,2-Dibromoethane           | < 5                       | 5.          | 1         | ug/kg        | 101      |           | 80-120          |     |         |
| 1,2-Dichloroethane          | < 5                       | 5.          | 1         | ug/kg        | 95       |           | 71-129          |     |         |
| Ethylbenzene                | < 5                       | 5.          | 1         | ug/kg        | 98       |           | 80-120          |     |         |
| Isopropylbenzene            | < 5                       | 5.          | 1         | ug/kg        | 101      |           | 76-120          |     |         |
| Methyl Tertiary Butyl Ether | < 5                       | 5.          | 0.5       | ug/kg        | 89       |           | 74-121          |     |         |
| Toluene                     | < 5                       | 5.          | 1         | ug/kg        | 97       |           | 80-120          |     |         |
| 1,2,4-Trimethylbenzene      | < 5                       | 5.          | 1         | ug/kg        | 96       |           | 79-120          |     |         |
| 1,3,5-Trimethylbenzene      | < 5                       | 5.          | 1         | ug/kg        | 97       |           | 78-120          |     |         |
| Xylene (Total)              | < 5                       | 5.          | 1         | ug/kg        | 101      |           | 80-120          |     |         |
| Batch number: 11118SLE026   | Sample number(s): 6267997 |             |           |              |          |           |                 |     |         |
| Anthracene                  | < 170                     | 170.        | 33        | ug/kg        | 97       |           | 83-111          |     |         |
| Benzo(a)anthracene          | < 170                     | 170.        | 33        | ug/kg        | 98       |           | 82-111          |     |         |
| Benzo(a)pyrene              | < 170                     | 170.        | 33        | ug/kg        | 103      |           | 63-138          |     |         |
| Benzo(b)fluoranthene        | < 170                     | 170.        | 33        | ug/kg        | 110      |           | 61-133          |     |         |
| Benzo(g,h,i)perylene        | < 170                     | 170.        | 33        | ug/kg        | 106      |           | 63-130          |     |         |
| Chrysene                    | < 170                     | 170.        | 33        | ug/kg        | 97       |           | 81-111          |     |         |
| Fluorene                    | < 170                     | 170.        | 33        | ug/kg        | 101      |           | 81-117          |     |         |
| Naphthalene                 | < 170                     | 170.        | 33        | ug/kg        | 94       |           | 83-112          |     |         |
| Phenanthrene                | < 170                     | 170.        | 33        | ug/kg        | 95       |           | 83-109          |     |         |
| Pyrene                      | < 170                     | 170.        | 33        | ug/kg        | 97       |           | 80-121          |     |         |
| Batch number: 111171026001A | Sample number(s): 6267997 |             |           |              |          |           |                 |     |         |
| Lead                        | < 0.198                   | 0.198       | 0.0103    | mg/kg        | 92       |           | 83-110          |     |         |
| Batch number: 11118820008A  | Sample number(s): 6267997 |             |           |              |          |           |                 |     |         |
| Moisture                    |                           |             |           |              | 100      |           | 99-101          |     |         |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name           | MS %REC                                  | MSD %REC | MS/MSD Limits | RPD  | RPD MAX | BKG Conc | DUP Conc | DUP RPD | Dup RPD Max |
|-------------------------|------------------------------------------|----------|---------------|------|---------|----------|----------|---------|-------------|
| Batch number: X111191AA | Sample number(s): 6267997 UNSPK: P266108 |          |               |      |         |          |          |         |             |
| Benzene                 | 62                                       | 107      | 55-143        | 14   | 30      |          |          |         |             |
| 1,2-Dibromoethane       | 78                                       | 103      | 54-129        | 6    | 30      |          |          |         |             |
| 1,2-Dichloroethane      | 55685                                    | -747     | 68-131        | 197* | 30      |          |          |         |             |
|                         | (2)                                      | (2)      |               |      |         |          |          |         |             |
| Ethylbenzene            | 92                                       | 101      | 44-141        | 26   | 30      |          |          |         |             |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243735

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name                                                                     | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD<br>RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|-----------------------------------------------------------------------------------|------------|-------------|------------------|------------|------------|-------------|-------------|------------|----------------|
| Isopropylbenzene                                                                  | 163*       | 64          | 38-144           | 89*        | 30         |             |             |            |                |
| Methyl Tertiary Butyl Ether                                                       | 77         | 85          | 55-129           | 24         | 30         |             |             |            |                |
| Toluene                                                                           | 160*       | 115         | 50-146           | 63*        | 30         |             |             |            |                |
| 1,2,4-Trimethylbenzene                                                            | 88         | 89          | 37-149           | 29         | 30         |             |             |            |                |
| 1,3,5-Trimethylbenzene                                                            | 63         | 97          | 38-150           | 9          | 30         |             |             |            |                |
| Xylene (Total)                                                                    | 87         | 103         | 44-136           | 18         | 30         |             |             |            |                |
| Batch number: 11118SLE026 Sample number(s): 6267997 UNSPK: P267988                |            |             |                  |            |            |             |             |            |                |
| Anthracene                                                                        | 108        | 694*        | 40-147           | 133*       | 30         |             |             |            |                |
| Benzo(a)anthracene                                                                | 131        | 1575*       | 32-150           | 149*       | 30         |             |             |            |                |
| Benzo(a)pyrene                                                                    | 140*       | 1628*       | 57-129           | 148*       | 30         |             |             |            |                |
| Benzo(b)fluoranthene                                                              | 159*       | 2292*       | 53-131           | 155*       | 30         |             |             |            |                |
| Benzo(g,h,i)perylene                                                              | 118        | 839*        | 60-123           | 129*       | 30         |             |             |            |                |
| Chrysene                                                                          | 122*       | 1441*       | 76-114           | 146*       | 30         |             |             |            |                |
| Fluorene                                                                          | 98         | 310*        | 46-137           | 99*        | 30         |             |             |            |                |
| Naphthalene                                                                       | 139*       | 428*        | 52-132           | 89*        | 30         |             |             |            |                |
| Phenanthrene                                                                      | 161*       | 2138*       | 34-147           | 154*       | 30         |             |             |            |                |
| Pyrene                                                                            | 154*       | 2829*       | 76-124           | 157*       | 30         |             |             |            |                |
| Batch number: 111171026001A Sample number(s): 6267997 UNSPK: P267982 BKG: P267982 |            |             |                  |            |            |             |             |            |                |
| Lead                                                                              | -1433      | -224        | 75-125           | 7          | 20         | 524         | 487         | 7          | 20             |
|                                                                                   | (2)        | (2)         |                  |            |            |             |             |            |                |
| Batch number: 11118820008A Sample number(s): 6267997 BKG: P267991                 |            |             |                  |            |            |             |             |            |                |
| Moisture                                                                          |            |             |                  |            |            | 17.3        | 17.0        | 2          | 15             |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111191AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6267997 | 110                  | 112*                  | 119        | 66*                  |
| Blank   | 102                  | 104                   | 91         | 92                   |
| LCS     | 101                  | 106                   | 101        | 98                   |
| MS      | 94                   | 70                    | 107        | 90                   |
| MSD     | 97                   | 98                    | 103        | 93                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: PAH 8270 (microwave)

Batch number: 11118SLE026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6267997 | 58              | 66               | 60            |
| Blank   | 90              | 93               | 94            |
| LCS     | 91              | 101              | 93            |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243735

### Surrogate Quality Control

|         |        |        |        |
|---------|--------|--------|--------|
| MS      | 100    | 111    | 94     |
| MSD     | 100    | 102    | 87     |
| Limits: | 55-121 | 56-121 | 43-124 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.



**Lancaster  
Laboratories**

Acct. # 10132 Group# 1243735 Sample # 6267997

**COC #** 259433

**For Lab Use Only**

FSC: \_\_\_\_\_  
SCR#: \_\_\_\_\_

[illegible]

Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-6766  
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

Issued by Dept. 6042 Management  
2102.05



0007 10132 ghp 1243736  
#6267997

★ So. 1

**Table 1b**  
**Constituents of Concern for Soil**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>METALS</b>                          | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Lead (total)                           | 7439-92-1      |
| <b>VOLATILE ORGANIC COMPOUNDS</b>      | <b>CAS No.</b> |
| 1,2-Dichloroethane                     | 107-06-2       |
| 1,2,4-Trimethylbenzene                 | 95-63-6        |
| 1,3,5-Trimethylbenzene                 | 108-67-8       |
| Benzene                                | 71-43-2        |
| Cumene                                 | 98-82-8        |
| Ethylbenzene                           | 100-41-4       |
| Ethylene dichloride                    | 105-93-4       |
| Methyl tertiary butyl ether            | 1634-04-4      |
| Toluene                                | 108-88-3       |
| Xylenes (total)                        | 1330-20-7      |
| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
| Anthracene                             | 120-12-7       |
| Benzofluoranthracene                   | 56-56-3        |
| Benzo (g,h,i) Perylene                 | 191-24-2       |
| Benzo(a)pyrene                         | 50-32-8        |
| Benzo(b)fluoranthrene                  | 205-99-2       |
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

**Notes:**  
1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.  
2. Select soil samples to be collected within the CAMU and delineation soil samples will be analyzed for full TCL VOCs, TCL SVOCs, and TAL metals.

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

May 05, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/25/2011  
Group Number: 1243734  
PO Number: PHILADELPHIA  
State of Sample Origin: PA

| <u>Client Sample Description</u> | <u>Lancaster Labs (LLI) #</u> |
|----------------------------------|-------------------------------|
| BH-10-67_0-2' Grab Soil          | 6267982                       |
| BH-10-66_0-2' Grab Soil          | 6267983                       |
| BH-10-78_0-2' Grab Soil          | 6267984                       |
| BH-10-79_0-2' Grab Soil          | 6267985                       |
| BH-10-80_0-2' Grab Soil          | 6267986                       |
| BH-10-53_0-2' Grab Soil          | 6267987                       |
| BH-10-54_0-2' Grab Soil          | 6267988                       |
| BH-10-62_0-2' Grab Soil          | 6267989                       |
| BH-10-61_0-2' Grab Soil          | 6267990                       |
| BH-10-60_0-2' Grab Soil          | 6267991                       |
| BH-10-75_0-2' Grab Soil          | 6267992                       |
| BH-10-82_0-2' Grab Soil          | 6267993                       |
| BH-10-81_0-2' Grab Soil          | 6267994                       |
| BH-10-83_0-2' Grab Soil          | 6267995                       |
| BH-10-57_0-2' Grab Soil          | 6267996                       |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

|                    |                      |                      |
|--------------------|----------------------|----------------------|
| ELECTRONIC COPY TO | Langan               | Attn: Dennis Webster |
| ELECTRONIC COPY TO | SUN: Aquaterra Tech. | Attn: Tiffani Doerr  |
| ELECTRONIC COPY TO | LLI                  | Attn: EDD Group      |
| ELECTRONIC COPY TO | Langan               | Attn: Kristen Ward   |



COPY TO  
ELECTRONIC      Aquaterra Tech  
COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Chad A. Moline  
Group Leader

**Sample Description:** BH-10-67\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-67\_0-2'

LLI Sample # SW 6267982  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-67

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 110          | 10                         | 1                          | 1.08            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 10         | 10                         | 2                          | 1.08            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 10         | 10                         | 2                          | 1.08            |
| 10950        | Ethylbenzene                | 100-41-4            | 23           | 10                         | 2                          | 1.08            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 10         | 10                         | 2                          | 1.08            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 10         | 10                         | 1                          | 1.08            |
| 10950        | Toluene                     | 108-88-3            | 220          | 10                         | 2                          | 1.08            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 160          | 10                         | 2                          | 1.08            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | 29           | 10                         | 2                          | 1.08            |
| 10950        | Xylene (Total)              | 1330-20-7           | 300          | 10                         | 2                          | 1.08            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 330          | 310          | 62           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 620          | 310          | 62           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 570          | 310          | 62           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 700          | 310          | 62           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 390          | 310          | 62           | 1 |
| 10724        | Chrysene             | 218-01-9            | 750          | 310          | 62           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 310        | 310          | 62           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 310        | 310          | 62           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,100        | 310          | 62           | 1 |
| 10724        | Pyrene               | 129-00-0            | 1,200        | 310          | 62           | 1 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 985          | 3.69         | 0.192        | 20 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 46.8     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-67\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-67\_0-2'

LLI Sample # SW 6267982  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-67

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA     | 04/29/2011 05:55       | Angela D Sneeringer | 1.08            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/21/2011 11:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/21/2011 11:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/21/2011 11:00       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 20:49       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 14:56       | Choon Y Tian        | 20              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher    | 1               |





# Analysis Report

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**Sample Description:** BH-10-66\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-66\_0-2'

LLI Sample # SW 6267983  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-66

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.79            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.79            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.79            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.79            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.79            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.79            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.79            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.79            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.79            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.79            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 200        | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 200        | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 200        | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 200        | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 200        | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | < 200        | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 200        | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | < 200        | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | < 200        | 200          | 40           | 1 |

|               |                    |              |              |              |   |
|---------------|--------------------|--------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06135 Lead    | 7439-92-1          | 250          | 0.592        | 0.0308       | 5 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 18.0     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Page 2 of 2

**Sample Description:** BH-10-66\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-66\_0-2'

LLI Sample # SW 6267983  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-66

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA     | 04/29/2011 06:18       | Angela D Sneeringer | 0.79            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/21/2011 11:15       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/21/2011 11:15       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/21/2011 11:15       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 21:15       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:13       | Choon Y Tian        | 5               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-78\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-78\_0-2'

LLI Sample # SW 6267984  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 14:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-78

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.82            |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 430          | 200          | 39           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 910          | 200          | 39           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 660          | 200          | 39           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 810          | 200          | 39           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 330          | 200          | 39           | 1 |
| 10724        | Chrysene             | 218-01-9            | 820          | 200          | 39           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 39           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 200        | 200          | 39           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,300        | 200          | 39           | 1 |
| 10724        | Pyrene               | 129-00-0            | 1,300        | 200          | 39           | 1 |

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|--------|------|-------------|-------|-------|--------|---|
| 06135  | Lead | 7439-92-1   | 79.3  | 0.236 | 0.0123 | 2 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 15.3 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst            | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|--------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA    | 04/29/2011 06:40       | Angela D Sneringer | 0.82            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 14:00       | Client Supplied    | 1               |

\*=This limit was used in the evaluation of the final result





# Analysis Report

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**Sample Description:** BH-10-78\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-78\_0-2'

LLI Sample # SW 6267984  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 14:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-78

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111624232  | 04/21/2011 14:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111624232  | 04/21/2011 14:00       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 21:42       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111171026001A | 04/29/2011 14:37       | Choon Y Tian      | 2               |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher  | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-79\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-79\_0-2'

LLI Sample # SW 6267985  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-79

| CAT No.                                                                                                                                                               | Analysis Name               | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>                                                                                                                                   |                             |            |            |                            |                            |                 |
| 10950                                                                                                                                                                 | Benzene                     | 71-43-2    | < 5        | 5                          | 0.5                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2-Dibromoethane           | 106-93-4   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2-Dichloroethane          | 107-06-2   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Ethylbenzene                | 100-41-4   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Isopropylbenzene            | 98-82-8    | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Methyl Tertiary Butyl Ether | 1634-04-4  | < 5        | 5                          | 0.5                        | 0.8             |
| 10950                                                                                                                                                                 | Toluene                     | 108-88-3   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2,4-Trimethylbenzene      | 95-63-6    | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,3,5-Trimethylbenzene      | 108-67-8   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Xylene (Total)              | 1330-20-7  | < 5        | 5                          | 0.9                        | 0.8             |
| <b>GC/MS Semivolatiles SW-846 8270C</b>                                                                                                                               |                             |            |            |                            |                            |                 |
| 10724                                                                                                                                                                 | Anthracene                  | 120-12-7   | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)anthracene          | 56-55-3    | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)pyrene              | 50-32-8    | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Benzo(b)fluoranthene        | 205-99-2   | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Benzo(g,h,i)perylene        | 191-24-2   | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Chrysene                    | 218-01-9   | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Fluorene                    | 86-73-7    | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Naphthalene                 | 91-20-3    | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Phenanthrene                | 85-01-8    | < 190      | 190                        | 38                         | 1               |
| 10724                                                                                                                                                                 | Pyrene                      | 129-00-0   | < 190      | 190                        | 38                         | 1               |
| <b>Metals SW-846 6020</b>                                                                                                                                             |                             |            |            |                            |                            |                 |
| 06135                                                                                                                                                                 | Lead                        | 7439-92-1  | 145        | 0.561                      | 0.0292                     | 5               |
| <b>Wet Chemistry SM20 2540 G</b>                                                                                                                                      |                             |            |            |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture                    | n.a.       | 12.6       | 0.50                       | 0.50                       | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                             |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst            | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|--------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA    | 04/29/2011 07:02       | Angela D Sneringer | 0.8             |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 14:30       | Client Supplied    | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-79\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-79\_0-2'

LLI Sample # SW 6267985  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-79

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111624232  | 04/21/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111624232  | 04/21/2011 14:30       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/29/2011 14:07       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:15       | Choon Y Tian      | 5               |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher  | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-80\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-80\_0-2'

LLI Sample # SW 6267986  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 15:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-80

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 9            | 5                          | 0.5                        | 0.81            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.81            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.81            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.81            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.81            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.81            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.81            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.81            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.81            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.81            |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 570          | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 1,700        | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 1,400        | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 1,900        | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 790          | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | 1,600        | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 200        | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,900        | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | 2,900        | 200          | 40           | 1 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 234          | 1.15         | 0.0599       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 16.5     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst            | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|--------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA    | 04/29/2011 07:25       | Angela D Sneringer | 0.81            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 15:00       | Client Supplied    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-80\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-80\_0-2'

LLI Sample # SW 6267986  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-80

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111624232  | 04/21/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111624232  | 04/21/2011 15:00       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/29/2011 14:33       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:17       | Choon Y Tian      | 10              |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher  | 1               |



# Analysis Report

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**Sample Description:** BH-10-53\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-53\_0-2'

LLI Sample # SW 6267987  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 08:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-53

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 18           | 9                          | 0.9                        | 0.98            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 9          | 9                          | 2                          | 0.98            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 9          | 9                          | 2                          | 0.98            |
| 10950        | Ethylbenzene                | 100-41-4            | < 9          | 9                          | 2                          | 0.98            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 9          | 9                          | 2                          | 0.98            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 9          | 9                          | 0.9                        | 0.98            |
| 10950        | Toluene                     | 108-88-3            | 10           | 9                          | 2                          | 0.98            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 9          | 9                          | 2                          | 0.98            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 9          | 9                          | 2                          | 0.98            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 9          | 9                          | 2                          | 0.98            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 320        | 320          | 63           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 530          | 320          | 63           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 390          | 320          | 63           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 480          | 320          | 63           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 320        | 320          | 63           | 1 |
| 10724        | Chrysene             | 218-01-9            | 470          | 320          | 63           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 320        | 320          | 63           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 320        | 320          | 63           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 900          | 320          | 63           | 1 |
| 10724        | Pyrene               | 129-00-0            | 860          | 320          | 63           | 1 |

The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 3,310        | 9.45         | 0.491        | 50 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 48.1     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-53\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-53\_0-2'

LLI Sample # SW 6267987  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 08:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-53

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA     | 04/29/2011 07:47       | Angela D Sneeringer | 0.98            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 08:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 08:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 08:30       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/29/2011 15:00       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:18       | Choon Y Tian        | 50              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher    | 1               |

**Sample Description:** BH-10-54\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-54\_0-2'

LLI Sample # SW 6267988  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-54

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | Toluene                     | 108-88-3            | 7            | 5                          | 1                          | 0.82            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.82            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 830          | 210          | 41           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 2,400        | 210          | 41           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 2,500        | 210          | 41           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 3,200        | 210          | 41           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 1,700        | 210          | 41           | 1 |
| 10724        | Chrysene             | 218-01-9            | 2,600        | 210          | 41           | 1 |
| 10724        | Fluorene             | 86-73-7             | 210          | 210          | 41           | 1 |
| 10724        | Naphthalene          | 91-20-3             | 870          | 210          | 41           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 2,800        | 210          | 41           | 1 |
| 10724        | Pyrene               | 129-00-0            | 4,400        | 210          | 41           | 1 |

The GC/MS semivolatile internal standard peak areas were outside of QC limits. The matrix spike and matrix spike duplicate samples were analyzed and internal standard peak areas were again outside of QC limits, indicating a matrix effect.

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|--------|------|-------------|-------|-------|--------|---|
| 06135  | Lead | 7439-92-1   | 186   | 0.625 | 0.0325 | 5 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 20.0 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description:** BH-10-54\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-54\_0-2'

LLI Sample # SW 6267988  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-54

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA     | 04/29/2011 08:09       | Angela D Sneeringer | 0.82            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 09:00       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11118SLE026   | 05/04/2011 07:54       | Brian K Graham      | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11118SLE026   | 04/29/2011 03:35       | Roman Kuropatkin    | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:20       | Choon Y Tian        | 5               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher    | 1               |



**Sample Description:** BH-10-62\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-62\_0-2'

LLI Sample # SW 6267989  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-62

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 51           | 10                         | 1                          | 1.07            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 10         | 10                         | 2                          | 1.07            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 10         | 10                         | 2                          | 1.07            |
| 10950        | Ethylbenzene                | 100-41-4            | < 10         | 10                         | 2                          | 1.07            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 10         | 10                         | 2                          | 1.07            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 10         | 10                         | 1                          | 1.07            |
| 10950        | Toluene                     | 108-88-3            | 24           | 10                         | 2                          | 1.07            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 10         | 10                         | 2                          | 1.07            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 10         | 10                         | 2                          | 1.07            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 10         | 10                         | 2                          | 1.07            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |    |
|--------------|----------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10724        | Anthracene           | 120-12-7            | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 3,400        | 3,100        | 620          | 10 |
| 10724        | Chrysene             | 218-01-9            | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Fluorene             | 86-73-7             | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Naphthalene          | 91-20-3             | 4,200        | 3,100        | 620          | 10 |
| 10724        | Phenanthrene         | 85-01-8             | < 3,100      | 3,100        | 620          | 10 |
| 10724        | Pyrene               | 129-00-0            | < 3,100      | 3,100        | 620          | 10 |

Reporting limits were raised due to interference from the sample matrix.

The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 2,580        | 9.13         | 0.475        | 50 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 46.3     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.



# Analysis Report

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**Sample Description:** BH-10-62\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-62\_0-2'

**LLI Sample #** SW 6267989  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/22/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/25/2011 15:50

West Chester PA 19381

**Reported:** 05/05/2011 18:45

10-62

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111182AA     | 04/29/2011 08:31       | Angela D Sneeringer | 1.07            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 09:30       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11118SLE026   | 05/04/2011 09:13       | Brian K Graham      | 10              |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11118SLE026   | 04/29/2011 03:35       | Roman Kuropatkin    | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:22       | Choon Y Tian        | 50              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-61\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-61\_0-2'

LLI Sample # SW 6267990  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 09:45 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-61

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.8             |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.8             |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.8             |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.8             |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.8             |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.8             |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.8             |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.8             |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.8             |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.8             |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 290          | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 650          | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 580          | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 700          | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 340          | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | 570          | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 200        | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,100        | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | 1,000        | 200          | 40           | 1 |

The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

|               |                    |              |              |              |   |
|---------------|--------------------|--------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06135 Lead    | 7439-92-1          | 118          | 0.581        | 0.0302       | 5 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 17.3     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result





# Analysis Report

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**Sample Description:** BH-10-61\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-61\_0-2'

**LLI Sample #** SW 6267990  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/22/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/25/2011 15:50

West Chester PA 19381

**Reported:** 05/05/2011 18:45

10-61

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111191AA     | 04/29/2011 09:56       | Emily R Styer    | 0.8             |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:45       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 09:45       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 09:45       | Client Supplied  | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11118SLE026   | 05/04/2011 09:39       | Brian K Graham   | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11118SLE026   | 04/29/2011 03:35       | Roman Kuropatkin | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:27       | Choon Y Tian     | 5               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz    | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-60\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-60\_0-2'

LLI Sample # SW 6267991  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-60

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 20           | 8                          | 0.8                        | 1.26            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 8          | 8                          | 2                          | 1.26            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 8          | 8                          | 2                          | 1.26            |
| 10950        | Ethylbenzene                | 100-41-4            | < 8          | 8                          | 2                          | 1.26            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 8          | 8                          | 2                          | 1.26            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 8          | 8                          | 0.8                        | 1.26            |
| 10950        | Toluene                     | 108-88-3            | 11           | 8                          | 2                          | 1.26            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 8          | 8                          | 2                          | 1.26            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 8          | 8                          | 2                          | 1.26            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 8          | 8                          | 2                          | 1.26            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |    |
|--------------|----------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10724        | Anthracene           | 120-12-7            | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Chrysene             | 218-01-9            | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Fluorene             | 86-73-7             | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Naphthalene          | 91-20-3             | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Phenanthrene         | 85-01-8             | < 20,000     | 20,000       | 4,000        | 10 |
| 10724        | Pyrene               | 129-00-0            | < 20,000     | 20,000       | 4,000        | 10 |

Reporting limits were raised due to interference from the sample matrix.

The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 777          | 2.35         | 0.122        | 20 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 17.3     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description:** BH-10-60\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-60\_0-2'

LLI Sample # SW 6267991  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/22/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-60

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111191AA     | 04/29/2011 10:19       | Emily R Styer    | 1.26            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232  | 04/22/2011 10:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232  | 04/22/2011 10:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232  | 04/22/2011 10:00       | Client Supplied  | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11118SLE026   | 05/04/2011 10:06       | Brian K Graham   | 10              |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11118SLE026   | 04/29/2011 03:35       | Roman Kuropatkin | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111171026001A | 04/29/2011 15:29       | Choon Y Tian     | 20              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111171026001  | 04/27/2011 12:18       | James L Mertz    | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11118820008A  | 04/28/2011 19:48       | Scott W Freisher | 1               |



**Sample Description:** BH-10-75\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-75\_0-2'

LLI Sample # SW 6267992  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-75

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | 99           | 19                         | 7                          | 0.82            |
| 10950        | Benzene                     | 71-43-2             | 5            | 5                          | 0.5                        | 0.82            |
| 10950        | Bromodichloromethane        | 75-27-4             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Bromoform                   | 75-25-2             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Bromomethane                | 74-83-9             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | 2-Butanone                  | 78-93-3             | 15           | 9                          | 4                          | 0.82            |
| 10950        | Carbon Disulfide            | 75-15-0             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Chlorobenzene               | 108-90-7            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Chloroethane                | 75-00-3             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Chloroform                  | 67-66-3             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Chloromethane               | 74-87-3             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Cyclohexane                 | 110-82-7            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Dibromochloromethane        | 124-48-1            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Freon 113                   | 76-13-1             | < 9          | 9                          | 2                          | 0.82            |
| 10950        | 2-Hexanone                  | 591-78-6            | < 9          | 9                          | 3                          | 0.82            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Methyl Acetate              | 79-20-9             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 9          | 9                          | 3                          | 0.82            |
| 10950        | Methylcyclohexane           | 108-87-2            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Methylene Chloride          | 75-09-2             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Styrene                     | 100-42-5            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Tetrachloroethene           | 127-18-4            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Trichloroethene             | 79-01-6             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 5          | 5                          | 2                          | 0.82            |
| 10950        | Vinyl Chloride              | 75-01-4             | < 5          | 5                          | 0.9                        | 0.82            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 0.9                        | 0.82            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-75\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-75\_0-2'

LLI Sample # SW 6267992  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 16:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-75

| CAT No. | Analysis Name                | CAS Number   | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------|------------------------------|--------------|------------|----------------------------|----------------------------|-----------------|
|         | was confirmed.               |              |            |                            |                            |                 |
| GC/MS   | Semivolatiles                | SW-846 8270C | ug/kg      | ug/kg                      | ug/kg                      |                 |
| 10727   | Acenaphthene                 | 83-32-9      | 360        | 190                        | 38                         | 1               |
| 10727   | Acenaphthylene               | 208-96-8     | 310        | 190                        | 38                         | 1               |
| 10727   | Acetophenone                 | 98-86-2      | < 190      | 190                        | 77                         | 1               |
| 10727   | Anthracene                   | 120-12-7     | 1,200      | 190                        | 38                         | 1               |
| 10727   | Atrazine                     | 1912-24-9    | < 190      | 190                        | 38                         | 1               |
| 10727   | Benzaldehyde                 | 100-52-7     | < 190      | 190                        | 77                         | 1               |
| 10727   | Benzo(a)anthracene           | 56-55-3      | 3,800      | 190                        | 38                         | 1               |
| 10727   | Benzo(a)pyrene               | 50-32-8      | 2,800      | 190                        | 38                         | 1               |
| 10727   | Benzo(b)fluoranthene         | 205-99-2     | 3,600      | 190                        | 38                         | 1               |
| 10727   | Benzo(g,h,i)perylene         | 191-24-2     | 1,900      | 190                        | 38                         | 1               |
| 10727   | Benzo(k)fluoranthene         | 207-08-9     | 2,100      | 190                        | 38                         | 1               |
| 10727   | 1,1'-Biphenyl                | 92-52-4      | < 190      | 190                        | 38                         | 1               |
| 10727   | 4-Bromophenyl-phenylether    | 101-55-3     | < 190      | 190                        | 38                         | 1               |
| 10727   | Butylbenzylphthalate         | 85-68-7      | < 190      | 190                        | 77                         | 1               |
| 10727   | Di-n-butylphthalate          | 84-74-2      | < 190      | 190                        | 77                         | 1               |
| 10727   | Caprolactam                  | 105-60-2     | < 190      | 190                        | 38                         | 1               |
| 10727   | Carbazole                    | 86-74-8      | 600        | 190                        | 38                         | 1               |
| 10727   | 4-Chloro-3-methylphenol      | 59-50-7      | < 190      | 190                        | 77                         | 1               |
| 10727   | 4-Chloroaniline              | 106-47-8     | < 190      | 190                        | 77                         | 1               |
| 10727   | bis(2-Chloroethoxy)methane   | 111-91-1     | < 190      | 190                        | 38                         | 1               |
| 10727   | bis(2-Chloroethyl)ether      | 111-44-4     | < 190      | 190                        | 38                         | 1               |
| 10727   | 2-Chloronaphthalene          | 91-58-7      | < 190      | 190                        | 38                         | 1               |
| 10727   | 2-Chlorophenol               | 95-57-8      | < 190      | 190                        | 38                         | 1               |
| 10727   | 4-Chlorophenyl-phenylether   | 7005-72-3    | < 190      | 190                        | 38                         | 1               |
| 10727   | 2,2'-oxybis(1-Chloropropane) | 108-60-1     | < 190      | 190                        | 38                         | 1               |
| 10727   | Chrysene                     | 218-01-9     | 3,500      | 190                        | 38                         | 1               |
| 10727   | Dibenz(a,h)anthracene        | 53-70-3      | 640        | 190                        | 38                         | 1               |
| 10727   | Dibenzofuran                 | 132-64-9     | 340        | 190                        | 38                         | 1               |
| 10727   | 3,3'-Dichlorobenzidine       | 91-94-1      | < 380      | 380                        | 110                        | 1               |
| 10727   | 2,4-Dichlorophenol           | 120-83-2     | < 190      | 190                        | 38                         | 1               |
| 10727   | Diethylphthalate             | 84-66-2      | < 190      | 190                        | 77                         | 1               |
| 10727   | 2,4-Dimethylphenol           | 105-67-9     | < 190      | 190                        | 77                         | 1               |
| 10727   | Dimethylphthalate            | 131-11-3     | < 190      | 190                        | 77                         | 1               |
| 10727   | 4,6-Dinitro-2-methylphenol   | 534-52-1     | < 570      | 570                        | 190                        | 1               |
| 10727   | 2,4-Dinitrophenol            | 51-28-5      | < 1,100    | 1,100                      | 380                        | 1               |
| 10727   | 2,4-Dinitrotoluene           | 121-14-2     | < 190      | 190                        | 77                         | 1               |
| 10727   | 2,6-Dinitrotoluene           | 606-20-2     | < 190      | 190                        | 38                         | 1               |
| 10727   | bis(2-Ethylhexyl)phthalate   | 117-81-7     | < 380      | 380                        | 77                         | 1               |
| 10727   | Fluoranthene                 | 206-44-0     | 6,600      | 380                        | 77                         | 2               |
| 10727   | Fluorene                     | 86-73-7      | 340        | 190                        | 38                         | 1               |
| 10727   | Hexachlorobenzene            | 118-74-1     | < 190      | 190                        | 38                         | 1               |
| 10727   | Hexachlorobutadiene          | 87-68-3      | < 190      | 190                        | 77                         | 1               |
| 10727   | Hexachlorocyclopentadiene    | 77-47-4      | < 570      | 570                        | 190                        | 1               |
| 10727   | Hexachloroethane             | 67-72-1      | < 190      | 190                        | 38                         | 1               |
| 10727   | Indeno(1,2,3-cd)pyrene       | 193-39-5     | 1,800      | 190                        | 38                         | 1               |
| 10727   | Isophorone                   | 78-59-1      | < 190      | 190                        | 38                         | 1               |
| 10727   | 2-Methylnaphthalene          | 91-57-6      | 260        | 190                        | 38                         | 1               |
| 10727   | 2-Methylphenol               | 95-48-7      | < 190      | 190                        | 77                         | 1               |
| 10727   | 4-Methylphenol               | 106-44-5     | < 190      | 190                        | 77                         | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-75\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-75\_0-2'

LLI Sample # SW 6267992  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-75

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 290          | 190                        | 38                         | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 190        | 190                        | 38                         | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 190        | 190                        | 77                         | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 190        | 190                        | 77                         | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 190        | 190                        | 38                         | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 190        | 190                        | 38                         | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 570        | 570                        | 190                        | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 190        | 190                        | 38                         | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 190        | 190                        | 38                         | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 190        | 190                        | 77                         | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 570        | 570                        | 190                        | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 4,800        | 380                        | 77                         | 2               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 190        | 190                        | 38                         | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 5,400        | 380                        | 77                         | 2               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 190        | 190                        | 77                         | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 190        | 190                        | 38                         | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 15,700       | 22.6                       | 5.68                       | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 2.26       | 2.26                       | 1.13                       | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 61.3         | 2.26                       | 1.07                       | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 147          | 0.565                      | 0.0452                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.856        | 0.565                      | 0.0768                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | < 0.565      | 0.565                      | 0.158                      | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 9,930        | 22.6                       | 6.92                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 45.5         | 1.69                       | 0.666                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 8.16         | 0.565                      | 0.215                      | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 61.8         | 1.13                       | 0.248                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 26,000       | 22.6                       | 5.32                       | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 192          | 1.69                       | 0.678                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 3,960        | 11.3                       | 2.87                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 464          | 0.565                      | 0.0881                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 25.3         | 1.13                       | 0.215                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,630        | 56.5                       | 20.3                       | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 2.26       | 2.26                       | 1.11                       | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 0.565      | 0.565                      | 0.203                      | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 292          | 113                        | 42.1                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 3.39       | 3.39                       | 1.64                       | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 62.9         | 0.565                      | 0.215                      | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 189          | 2.26                       | 0.745                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 00159         | Mercury                                                                                                                                                                                                     | 7439-97-6           | 0.182        | 0.113                      | 0.0032                     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-75\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-75\_0-2'

**LLI Sample #** SW 6267992  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-75

| CAT No.              | Analysis Name                                                                                                                                                         | CAS Number  | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |                                                                                                                                                                       |             |            |                            |                            |                 |
| 00111                | Moisture                                                                                                                                                              | SM20 2540 G | %          | %                          | %                          | 1               |
|                      | n.a. 13.2 0.50 0.50                                                                                                                                                   |             |            |                            |                            |                 |
|                      | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |             |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111191AA    | 04/29/2011 11:28       | Emily R Styer     | 0.82            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/19/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232 | 04/19/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232 | 04/19/2011 16:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11117SLJ026  | 04/30/2011 06:52       | Ryan P Byrne      | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11117SLJ026  | 04/30/2011 12:33       | Chad A Moline     | 2               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11117SLJ026  | 04/28/2011 08:45       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 21:56       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 21:56       | John W Yanzuk II  | 1               |
| 06971   | Vanadium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |
| 06972   | Zinc                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 19:49       | John P Hook       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-75\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-75\_0-2'

**LLI Sample #** SW 6267992  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-75

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 00159   | Mercury             | SW-846 7471A          | 1      | 111175711001 | 04/28/2011 07:18       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111175708002 | 04/27/2011 20:11       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111175711001 | 04/27/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11118820008A | 04/28/2011 19:48       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-82\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-82\_0-2'

LLI Sample # SW 6267993  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 15:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-82

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | 320          | 23                         | 8                          | 0.77            |
| 10950        | Benzene                     | 71-43-2             | < 6          | 6                          | 0.6                        | 0.77            |
| 10950        | Bromodichloromethane        | 75-27-4             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Bromoform                   | 75-25-2             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Bromomethane                | 74-83-9             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | 2-Butanone                  | 78-93-3             | 13           | 12                         | 5                          | 0.77            |
| 10950        | Carbon Disulfide            | 75-15-0             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Chlorobenzene               | 108-90-7            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Chloroethane                | 75-00-3             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Chloroform                  | 67-66-3             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Chloromethane               | 74-87-3             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Cyclohexane                 | 110-82-7            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Dibromochloromethane        | 124-48-1            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 6          | 6                          | 1                          | 0.77            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Freon 113                   | 76-13-1             | < 12         | 12                         | 2                          | 0.77            |
| 10950        | 2-Hexanone                  | 591-78-6            | < 12         | 12                         | 4                          | 0.77            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Methyl Acetate              | 79-20-9             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.77            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 12         | 12                         | 4                          | 0.77            |
| 10950        | Methylcyclohexane           | 108-87-2            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Methylene Chloride          | 75-09-2             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Styrene                     | 100-42-5            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Tetrachloroethene           | 127-18-4            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Toluene                     | 108-88-3            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Trichloroethene             | 79-01-6             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 6          | 6                          | 2                          | 0.77            |
| 10950        | Vinyl Chloride              | 75-01-4             | < 6          | 6                          | 1                          | 0.77            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 6          | 6                          | 1                          | 0.77            |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-82\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-82\_0-2'

LLI Sample # SW 6267993  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 15:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-82

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 250          | 250                        | 50                         | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | < 250        | 250                        | 50                         | 1               |
| 10727        | Acetophenone                 | 98-86-2             | < 250        | 250                        | 100                        | 1               |
| 10727        | Anthracene                   | 120-12-7            | 740          | 250                        | 50                         | 1               |
| 10727        | Atrazine                     | 1912-24-9           | < 250        | 250                        | 50                         | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | < 250        | 250                        | 100                        | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 1,300        | 250                        | 50                         | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 960          | 250                        | 50                         | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 1,100        | 250                        | 50                         | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 540          | 250                        | 50                         | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 630          | 250                        | 50                         | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 250        | 250                        | 50                         | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 250        | 250                        | 50                         | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 250        | 250                        | 100                        | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 250        | 250                        | 100                        | 1               |
| 10727        | Caprolactam                  | 105-60-2            | < 250        | 250                        | 50                         | 1               |
| 10727        | Carbazole                    | 86-74-8             | 270          | 250                        | 50                         | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 250        | 250                        | 100                        | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 250        | 250                        | 100                        | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 250        | 250                        | 50                         | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 250        | 250                        | 50                         | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 250        | 250                        | 50                         | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 250        | 250                        | 50                         | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 250        | 250                        | 50                         | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 250        | 250                        | 50                         | 1               |
| 10727        | Chrysene                     | 218-01-9            | 1,200        | 250                        | 50                         | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | < 250        | 250                        | 50                         | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | < 250        | 250                        | 50                         | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 500        | 500                        | 150                        | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 250        | 250                        | 50                         | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | < 250        | 250                        | 100                        | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 250        | 250                        | 100                        | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | < 250        | 250                        | 100                        | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 750        | 750                        | 250                        | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 1,500      | 1,500                      | 500                        | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 250        | 250                        | 100                        | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 250        | 250                        | 50                         | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | < 500        | 500                        | 100                        | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 1,900        | 250                        | 50                         | 1               |
| 10727        | Fluorene                     | 86-73-7             | 280          | 250                        | 50                         | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 250        | 250                        | 50                         | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 250        | 250                        | 100                        | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 750        | 750                        | 250                        | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | < 250        | 250                        | 50                         | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 550          | 250                        | 50                         | 1               |
| 10727        | Isophorone                   | 78-59-1             | < 250        | 250                        | 50                         | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | < 250        | 250                        | 50                         | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | < 250        | 250                        | 100                        | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | < 250        | 250                        | 100                        | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-82\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-82\_0-2'

LLI Sample # SW 6267993  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 15:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-82

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 250        | 250                        | 50                         | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 250        | 250                        | 50                         | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 250        | 250                        | 100                        | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 250        | 250                        | 100                        | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 250        | 250                        | 50                         | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 250        | 250                        | 50                         | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 750        | 750                        | 250                        | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 250        | 250                        | 50                         | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 250        | 250                        | 50                         | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 250        | 250                        | 100                        | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 750        | 750                        | 250                        | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 2,500        | 250                        | 50                         | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 250        | 250                        | 50                         | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 2,500        | 250                        | 50                         | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 250        | 250                        | 100                        | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 250        | 250                        | 50                         | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 26,300       | 30.0                       | 7.56                       | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 3.00       | 3.00                       | 1.50                       | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 17.0         | 3.00                       | 1.43                       | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 261          | 0.751                      | 0.0601                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.10         | 0.751                      | 0.102                      | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | < 0.751      | 0.751                      | 0.210                      | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 21,500       | 30.0                       | 9.21                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 117          | 2.25                       | 0.886                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 11.0         | 0.751                      | 0.285                      | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 122          | 1.50                       | 0.331                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 47,200       | 150                        | 35.4                       | 5               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 584          | 2.25                       | 0.901                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 7,070        | 15.0                       | 3.82                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 576          | 0.751                      | 0.117                      | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 41.6         | 1.50                       | 0.285                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 2,020        | 75.1                       | 27.0                       | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 15.0       | 15.0                       | 7.36                       | 5               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 0.751      | 0.751                      | 0.270                      | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | < 150        | 150                        | 56.0                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 22.5       | 22.5                       | 10.9                       | 5               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 106          | 0.751                      | 0.285                      | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 271          | 3.00                       | 0.992                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 00159         | Mercury                                                                                                                                                                                                     | 7439-97-6           | 0.215        | 0.146                      | 0.0042                     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-82\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-82\_0-2'

**LLI Sample #** SW 6267993  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 15:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-82

| CAT No.              | Analysis Name                                                                                                                                                         | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |                                                                                                                                                                       |            |            |                            |                            |                 |
|                      | <b>SM20 2540 G</b>                                                                                                                                                    |            | <b>%</b>   | <b>%</b>                   | <b>%</b>                   |                 |
| 00111                | Moisture                                                                                                                                                              | n.a.       | 34.1       | 0.50                       | 0.50                       | 1               |
|                      | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111231AA    | 05/03/2011 03:44       | Holly Berry       | 0.77            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/20/2011 15:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232 | 04/20/2011 15:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232 | 04/20/2011 15:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 111175708002 | 04/30/2011 07:17       | Ryan P Byrne      | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 111175708002 | 04/28/2011 08:45       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:20       | John P Hook       | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:18       | Joanne M Gates    | 5               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:18       | Joanne M Gates    | 5               |
| 06971   | Vanadium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 06972   | Zinc                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:14       | John P Hook       | 1               |
| 00159   | Mercury                        | SW-846 7471A | 1      | 111175711001 | 04/28/2011 07:25       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-82\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-82\_0-2'

LLI Sample # SW 6267993  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 15:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-82

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111175708002 | 04/27/2011 20:11       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111175711001 | 04/27/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11118820008A | 04/28/2011 19:48       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-81\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-81\_0-2'

LLI Sample # SW 6267994  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-81

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | 33           | 18                         | 6                          | 0.77            |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.77            |
| 10950        | Bromodichloromethane        | 75-27-4             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Bromoform                   | 75-25-2             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Bromomethane                | 74-83-9             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | 2-Butanone                  | 78-93-3             | < 9          | 9                          | 4                          | 0.77            |
| 10950        | Carbon Disulfide            | 75-15-0             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Chlorobenzene               | 108-90-7            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Chloroethane                | 75-00-3             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Chloroform                  | 67-66-3             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Chloromethane               | 74-87-3             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Cyclohexane                 | 110-82-7            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Dibromochloromethane        | 124-48-1            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Freon 113                   | 76-13-1             | < 9          | 9                          | 2                          | 0.77            |
| 10950        | 2-Hexanone                  | 591-78-6            | < 9          | 9                          | 3                          | 0.77            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Methyl Acetate              | 79-20-9             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.77            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 9          | 9                          | 3                          | 0.77            |
| 10950        | Methylcyclohexane           | 108-87-2            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Methylene Chloride          | 75-09-2             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Styrene                     | 100-42-5            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Tetrachloroethene           | 127-18-4            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Trichloroethene             | 79-01-6             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 5          | 5                          | 2                          | 0.77            |
| 10950        | Vinyl Chloride              | 75-01-4             | < 5          | 5                          | 0.9                        | 0.77            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 0.9                        | 0.77            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-81\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-81\_0-2'

LLI Sample # SW 6267994  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-81

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | < 200        | 200                        | 40                         | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | < 200        | 200                        | 40                         | 1               |
| 10727        | Acetophenone                 | 98-86-2             | < 200        | 200                        | 80                         | 1               |
| 10727        | Anthracene                   | 120-12-7            | 390          | 200                        | 40                         | 1               |
| 10727        | Atrazine                     | 1912-24-9           | < 200        | 200                        | 40                         | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | < 200        | 200                        | 80                         | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 1,900        | 200                        | 40                         | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 2,700        | 200                        | 40                         | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 2,500        | 200                        | 40                         | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 3,100        | 200                        | 40                         | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 840          | 200                        | 40                         | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 200        | 200                        | 40                         | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 200        | 200                        | 40                         | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 200        | 200                        | 80                         | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 200        | 200                        | 80                         | 1               |
| 10727        | Caprolactam                  | 105-60-2            | < 200        | 200                        | 40                         | 1               |
| 10727        | Carbazole                    | 86-74-8             | < 200        | 200                        | 40                         | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 200        | 200                        | 80                         | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 200        | 200                        | 80                         | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 200        | 200                        | 40                         | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 200        | 200                        | 40                         | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 200        | 200                        | 40                         | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 200        | 200                        | 40                         | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 200        | 200                        | 40                         | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 200        | 200                        | 40                         | 1               |
| 10727        | Chrysene                     | 218-01-9            | 2,400        | 200                        | 40                         | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 2,200        | 200                        | 40                         | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | < 200        | 200                        | 40                         | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 400        | 400                        | 120                        | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 200        | 200                        | 40                         | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | < 200        | 200                        | 80                         | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 200        | 200                        | 80                         | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | < 200        | 200                        | 80                         | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 600        | 600                        | 200                        | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 1,200      | 1,200                      | 400                        | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 200        | 200                        | 80                         | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 200        | 200                        | 40                         | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 400          | 400                        | 80                         | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 1,700        | 200                        | 40                         | 1               |
| 10727        | Fluorene                     | 86-73-7             | < 200        | 200                        | 40                         | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 200        | 200                        | 40                         | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 200        | 200                        | 80                         | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 600        | 600                        | 200                        | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | < 200        | 200                        | 40                         | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,900        | 200                        | 40                         | 1               |
| 10727        | Isophorone                   | 78-59-1             | < 200        | 200                        | 40                         | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 510          | 200                        | 40                         | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | < 200        | 200                        | 80                         | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | < 200        | 200                        | 80                         | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-81\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-81\_0-2'

LLI Sample # SW 6267994  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-81

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 360          | 200                        | 40                         | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 200        | 200                        | 40                         | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 200        | 200                        | 80                         | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 200        | 200                        | 80                         | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 200        | 200                        | 40                         | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 200        | 200                        | 40                         | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 600        | 600                        | 200                        | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 200        | 200                        | 40                         | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 200        | 200                        | 40                         | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 200        | 200                        | 80                         | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 600        | 600                        | 200                        | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 1,600        | 200                        | 40                         | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 200        | 200                        | 40                         | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 2,000        | 200                        | 40                         | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 200        | 200                        | 80                         | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 200        | 200                        | 40                         | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 10,100       | 118                        | 29.6                       | 5               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 11.8       | 11.8                       | 5.88                       | 5               |
|               | Reporting limits for ICP metals were raised due to interference from the sample matrix.                                                                                                                     |                     |              |                            |                            |                 |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 38.9         | 11.8                       | 5.58                       | 5               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 122          | 0.588                      | 0.0470                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.698        | 0.588                      | 0.0799                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | < 2.94       | 2.94                       | 0.823                      | 5               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 6,520        | 23.5                       | 7.21                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 54.8         | 8.82                       | 3.47                       | 5               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 13.1         | 2.94                       | 1.12                       | 5               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 94.2         | 5.88                       | 1.29                       | 5               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 68,100       | 118                        | 27.7                       | 5               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 242          | 8.82                       | 3.53                       | 5               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 3,040        | 11.8                       | 2.99                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 539          | 0.588                      | 0.0917                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 37.2         | 5.88                       | 1.12                       | 5               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,690        | 294                        | 106                        | 5               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 11.8       | 11.8                       | 5.76                       | 5               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 2.94       | 2.94                       | 1.06                       | 5               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 138          | 118                        | 43.8                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 17.6       | 17.6                       | 8.52                       | 5               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 63.1         | 2.94                       | 1.12                       | 5               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 141          | 11.8                       | 3.88                       | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-81\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-81\_0-2'

**LLI Sample #** SW 6267994  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-81

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                            |                            |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | 0.373      | 0.118                      | 0.0034                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | 16.6       | 0.50                       | 0.50                       | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111231AA    | 05/03/2011 04:06       | Holly Berry       | 0.77            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232 | 04/21/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232 | 04/21/2011 09:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 111175708002 | 04/30/2011 12:58       | Chad A Moline     | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 111175708002 | 04/28/2011 08:45       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:21       | Joanne M Gates    | 5               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 21:24       | John P Hook       | 5               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:18       | John P Hook       | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:21       | Joanne M Gates    | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-81\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-81\_0-2'

**LLI Sample #** SW 6267994  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-81

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis<br>Date and Time |       | Analyst                 | Dilution<br>Factor |
|------------|---------------------|--------------------------|--------|--------------|---------------------------|-------|-------------------------|--------------------|
|            |                     |                          |        |              |                           |       |                         |                    |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111175708002 | 05/03/2011                | 21:24 | John P Hook             | 5                  |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111175708002 | 05/03/2011                | 21:24 | John P Hook             | 5                  |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111175711001 | 04/28/2011                | 07:26 | Damary Valentin         | 1                  |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111175708002 | 04/27/2011                | 20:11 | Annamaria<br>Stipkovits | 1                  |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111175711001 | 04/27/2011                | 23:40 | Annamaria<br>Stipkovits | 1                  |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11118820008A | 04/28/2011                | 19:48 | Scott W Freisher        | 1                  |





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 5

**Sample Description:** BH-10-83\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-83\_0-2'

LLI Sample # SW 6267995  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:40 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-83

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------|-----------------------------|--------------|------------|----------------------------|----------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                      | ug/kg                      |                 |
| 10950   | Acetone                     | 67-64-1      | 260        | 25                         | 9                          | 0.98            |
| 10950   | Benzene                     | 71-43-2      | 12         | 6                          | 0.6                        | 0.98            |
| 10950   | Bromodichloromethane        | 75-27-4      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Bromoform                   | 75-25-2      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Bromomethane                | 74-83-9      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | 2-Butanone                  | 78-93-3      | 27         | 13                         | 5                          | 0.98            |
| 10950   | Carbon Disulfide            | 75-15-0      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Carbon Tetrachloride        | 56-23-5      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Chlorobenzene               | 108-90-7     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Chloroethane                | 75-00-3      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Chloroform                  | 67-66-3      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Chloromethane               | 74-87-3      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Cyclohexane                 | 110-82-7     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Dibromochloromethane        | 124-48-1     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | < 6        | 6                          | 1                          | 0.98            |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Ethylbenzene                | 100-41-4     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Freon 113                   | 76-13-1      | < 13       | 13                         | 3                          | 0.98            |
| 10950   | 2-Hexanone                  | 591-78-6     | < 13       | 13                         | 4                          | 0.98            |
| 10950   | Isopropylbenzene            | 98-82-8      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Methyl Acetate              | 79-20-9      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | < 6        | 6                          | 0.6                        | 0.98            |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | < 13       | 13                         | 4                          | 0.98            |
| 10950   | Methylcyclohexane           | 108-87-2     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Methylene Chloride          | 75-09-2      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Styrene                     | 100-42-5     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Tetrachloroethene           | 127-18-4     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Toluene                     | 108-88-3     | 9          | 6                          | 1                          | 0.98            |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Trichloroethene             | 79-01-6      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Trichlorofluoromethane      | 75-69-4      | < 6        | 6                          | 3                          | 0.98            |
| 10950   | Vinyl Chloride              | 75-01-4      | < 6        | 6                          | 1                          | 0.98            |
| 10950   | Xylene (Total)              | 1330-20-7    | < 6        | 6                          | 1                          | 0.98            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-83\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-83\_0-2'

LLI Sample # SW 6267995  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-83

| CAT No. | Analysis Name                | CAS Number   | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------|------------------------------|--------------|------------|----------------------------|----------------------------|-----------------|
|         | was confirmed.               |              |            |                            |                            |                 |
| GC/MS   | Semivolatiles                | SW-846 8270C | ug/kg      | ug/kg                      | ug/kg                      |                 |
| 10727   | Acenaphthene                 | 83-32-9      | < 220      | 220                        | 43                         | 1               |
| 10727   | Acenaphthylene               | 208-96-8     | < 220      | 220                        | 43                         | 1               |
| 10727   | Acetophenone                 | 98-86-2      | < 220      | 220                        | 86                         | 1               |
| 10727   | Anthracene                   | 120-12-7     | 270        | 220                        | 43                         | 1               |
| 10727   | Atrazine                     | 1912-24-9    | < 220      | 220                        | 43                         | 1               |
| 10727   | Benzaldehyde                 | 100-52-7     | < 220      | 220                        | 86                         | 1               |
| 10727   | Benzo(a)anthracene           | 56-55-3      | 730        | 220                        | 43                         | 1               |
| 10727   | Benzo(a)pyrene               | 50-32-8      | 680        | 220                        | 43                         | 1               |
| 10727   | Benzo(b)fluoranthene         | 205-99-2     | 890        | 220                        | 43                         | 1               |
| 10727   | Benzo(g,h,i)perylene         | 191-24-2     | 590        | 220                        | 43                         | 1               |
| 10727   | Benzo(k)fluoranthene         | 207-08-9     | 370        | 220                        | 43                         | 1               |
| 10727   | 1,1'-Biphenyl                | 92-52-4      | < 220      | 220                        | 43                         | 1               |
| 10727   | 4-Bromophenyl-phenylether    | 101-55-3     | < 220      | 220                        | 43                         | 1               |
| 10727   | Butylbenzylphthalate         | 85-68-7      | 740        | 220                        | 86                         | 1               |
| 10727   | Di-n-butylphthalate          | 84-74-2      | 300        | 220                        | 86                         | 1               |
| 10727   | Caprolactam                  | 105-60-2     | < 220      | 220                        | 43                         | 1               |
| 10727   | Carbazole                    | 86-74-8      | < 220      | 220                        | 43                         | 1               |
| 10727   | 4-Chloro-3-methylphenol      | 59-50-7      | < 220      | 220                        | 86                         | 1               |
| 10727   | 4-Chloroaniline              | 106-47-8     | < 220      | 220                        | 86                         | 1               |
| 10727   | bis(2-Chloroethoxy)methane   | 111-91-1     | < 220      | 220                        | 43                         | 1               |
| 10727   | bis(2-Chloroethyl)ether      | 111-44-4     | < 220      | 220                        | 43                         | 1               |
| 10727   | 2-Chloronaphthalene          | 91-58-7      | < 220      | 220                        | 43                         | 1               |
| 10727   | 2-Chlorophenol               | 95-57-8      | < 220      | 220                        | 43                         | 1               |
| 10727   | 4-Chlorophenyl-phenylether   | 7005-72-3    | < 220      | 220                        | 43                         | 1               |
| 10727   | 2,2'-oxybis(1-Chloropropane) | 108-60-1     | < 220      | 220                        | 43                         | 1               |
| 10727   | Chrysene                     | 218-01-9     | 840        | 220                        | 43                         | 1               |
| 10727   | Dibenz(a,h)anthracene        | 53-70-3      | < 220      | 220                        | 43                         | 1               |
| 10727   | Dibenzofuran                 | 132-64-9     | < 220      | 220                        | 43                         | 1               |
| 10727   | 3,3'-Dichlorobenzidine       | 91-94-1      | < 430      | 430                        | 130                        | 1               |
| 10727   | 2,4-Dichlorophenol           | 120-83-2     | < 220      | 220                        | 43                         | 1               |
| 10727   | Diethylphthalate             | 84-66-2      | < 220      | 220                        | 86                         | 1               |
| 10727   | 2,4-Dimethylphenol           | 105-67-9     | < 220      | 220                        | 86                         | 1               |
| 10727   | Dimethylphthalate            | 131-11-3     | < 220      | 220                        | 86                         | 1               |
| 10727   | 4,6-Dinitro-2-methylphenol   | 534-52-1     | < 650      | 650                        | 220                        | 1               |
| 10727   | 2,4-Dinitrophenol            | 51-28-5      | < 1,300    | 1,300                      | 430                        | 1               |
| 10727   | 2,4-Dinitrotoluene           | 121-14-2     | < 220      | 220                        | 86                         | 1               |
| 10727   | 2,6-Dinitrotoluene           | 606-20-2     | < 220      | 220                        | 43                         | 1               |
| 10727   | bis(2-Ethylhexyl)phthalate   | 117-81-7     | 1,000      | 430                        | 86                         | 1               |
| 10727   | Fluoranthene                 | 206-44-0     | 1,200      | 220                        | 43                         | 1               |
| 10727   | Fluorene                     | 86-73-7      | < 220      | 220                        | 43                         | 1               |
| 10727   | Hexachlorobenzene            | 118-74-1     | < 220      | 220                        | 43                         | 1               |
| 10727   | Hexachlorobutadiene          | 87-68-3      | < 220      | 220                        | 86                         | 1               |
| 10727   | Hexachlorocyclopentadiene    | 77-47-4      | < 650      | 650                        | 220                        | 1               |
| 10727   | Hexachloroethane             | 67-72-1      | < 220      | 220                        | 43                         | 1               |
| 10727   | Indeno(1,2,3-cd)pyrene       | 193-39-5     | 440        | 220                        | 43                         | 1               |
| 10727   | Isophorone                   | 78-59-1      | < 220      | 220                        | 43                         | 1               |
| 10727   | 2-Methylnaphthalene          | 91-57-6      | < 220      | 220                        | 43                         | 1               |
| 10727   | 2-Methylphenol               | 95-48-7      | < 220      | 220                        | 86                         | 1               |
| 10727   | 4-Methylphenol               | 106-44-5     | < 220      | 220                        | 86                         | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-83\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-83\_0-2'

LLI Sample # SW 6267995  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/25/2011 15:50

PO Box 744

Reported: 05/05/2011 18:45

West Chester PA 19381

10-83

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 220        | 220                        | 43                         | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 220        | 220                        | 43                         | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 220        | 220                        | 86                         | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 220        | 220                        | 86                         | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 220        | 220                        | 43                         | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 220        | 220                        | 43                         | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 650        | 650                        | 220                        | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 220        | 220                        | 43                         | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 220        | 220                        | 43                         | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 220        | 220                        | 86                         | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 650        | 650                        | 220                        | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 1,000        | 220                        | 43                         | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 220        | 220                        | 43                         | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 1,100        | 220                        | 43                         | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 220        | 220                        | 86                         | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 220        | 220                        | 43                         | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 17,200       | 25.5                       | 6.41                       | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 2.55       | 2.55                       | 1.27                       | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 13.7         | 2.55                       | 1.21                       | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 272          | 0.637                      | 0.0510                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.797        | 0.637                      | 0.0867                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 3.98         | 0.637                      | 0.178                      | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 15,800       | 25.5                       | 7.82                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 86.9         | 1.91                       | 0.752                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 9.93         | 0.637                      | 0.242                      | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 212          | 1.27                       | 0.280                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 28,400       | 25.5                       | 6.00                       | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 402          | 1.91                       | 0.765                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 7,310        | 12.7                       | 3.24                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 384          | 0.637                      | 0.0994                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 44.8         | 1.27                       | 0.242                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,820        | 63.7                       | 22.9                       | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 2.55       | 2.55                       | 1.25                       | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 0.637      | 0.637                      | 0.229                      | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 160          | 127                        | 47.6                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 3.82       | 3.82                       | 1.85                       | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 65.3         | 0.637                      | 0.242                      | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 369          | 2.55                       | 0.841                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 00159         | Mercury                                                                                                                                                                                                     | 7439-97-6           | 0.387        | 0.126                      | 0.0036                     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-83\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-83\_0-2'

**LLI Sample #** SW 6267995  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 09:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-83

| CAT No.              | Analysis Name                                                                                                                                                         | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |                                                                                                                                                                       |            |            |                            |                            |                 |
|                      | <b>SM20 2540 G</b>                                                                                                                                                    |            | %          | %                          | %                          |                 |
| 00111                | Moisture                                                                                                                                                              | n.a.       | 23.1       | 0.50                       | 0.50                       | 1               |
|                      | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111191AA    | 04/29/2011 12:36       | Emily R Styer     | 0.98            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 09:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232 | 04/21/2011 09:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232 | 04/21/2011 09:40       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 111175708002 | 04/30/2011 13:23       | Chad A Moline     | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 111175708002 | 04/28/2011 08:45       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:30       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:30       | Joanne M Gates    | 1               |
| 06971   | Vanadium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 06972   | Zinc                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:29       | John P Hook       | 1               |
| 00159   | Mercury                        | SW-846 7471A | 1      | 111175711001 | 04/28/2011 07:27       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-83\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-83\_0-2'

**LLI Sample #** SW 6267995  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/21/2011 09:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/25/2011 15:50

West Chester PA 19381

**Reported:** 05/05/2011 18:45

10-83

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## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111175708002 | 04/27/2011 20:11       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111175711001 | 04/27/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11118820008A | 04/28/2011 19:48       | Scott W Freisher     | 1               |



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 5

**Sample Description:** BH-10-57\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-57\_0-2'

LLI Sample # SW 6267996  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-57

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------|-----------------------------|--------------|------------|----------------------------|----------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                      | ug/kg                      |                 |
| 10950   | Acetone                     | 67-64-1      | < 15,000   | 15,000                     | 5,300                      | 607.74          |
| 10950   | Benzene                     | 71-43-2      | < 3,800    | 3,800                      | 380                        | 607.74          |
| 10950   | Bromodichloromethane        | 75-27-4      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Bromoform                   | 75-25-2      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Bromomethane                | 74-83-9      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | 2-Butanone                  | 78-93-3      | < 7,600    | 7,600                      | 3,000                      | 607.74          |
| 10950   | Carbon Disulfide            | 75-15-0      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Carbon Tetrachloride        | 56-23-5      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Chlorobenzene               | 108-90-7     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Chloroethane                | 75-00-3      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Chloroform                  | 67-66-3      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Chloromethane               | 74-87-3      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Cyclohexane                 | 110-82-7     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Dibromochloromethane        | 124-48-1     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Ethylbenzene                | 100-41-4     | 5,700      | 3,800                      | 760                        | 607.74          |
| 10950   | Freon 113                   | 76-13-1      | < 7,600    | 7,600                      | 1,500                      | 607.74          |
| 10950   | 2-Hexanone                  | 591-78-6     | < 7,600    | 7,600                      | 2,300                      | 607.74          |
| 10950   | Isopropylbenzene            | 98-82-8      | 22,000     | 3,800                      | 760                        | 607.74          |
| 10950   | Methyl Acetate              | 79-20-9      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | < 3,800    | 3,800                      | 380                        | 607.74          |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | < 7,600    | 7,600                      | 2,300                      | 607.74          |
| 10950   | Methylcyclohexane           | 108-87-2     | 7,000      | 3,800                      | 760                        | 607.74          |
| 10950   | Methylene Chloride          | 75-09-2      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Styrene                     | 100-42-5     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Tetrachloroethene           | 127-18-4     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Toluene                     | 108-88-3     | 13,000     | 3,800                      | 760                        | 607.74          |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Trichloroethene             | 79-01-6      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Trichlorofluoromethane      | 75-69-4      | < 3,800    | 3,800                      | 1,500                      | 607.74          |
| 10950   | Vinyl Chloride              | 75-01-4      | < 3,800    | 3,800                      | 760                        | 607.74          |
| 10950   | Xylene (Total)              | 1330-20-7    | 25,000     | 3,800                      | 760                        | 607.74          |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-57\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-57\_0-2'

LLI Sample # SW 6267996  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-57

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Acetophenone                 | 98-86-2             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Anthracene                   | 120-12-7            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Atrazine                     | 1912-24-9           | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Caprolactam                  | 105-60-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Carbazole                    | 86-74-8             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Chrysene                     | 218-01-9            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 21,000     | 21,000                     | 6,200                      | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 31,000     | 31,000                     | 10,000                     | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 62,000     | 62,000                     | 21,000                     | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | < 21,000     | 21,000                     | 4,100                      | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Fluorene                     | 86-73-7             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 31,000     | 31,000                     | 10,000                     | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Isophorone                   | 78-59-1             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | < 10,000     | 10,000                     | 4,100                      | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-57\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-57\_0-2'

LLI Sample # SW 6267996  
LLI Group # 1243734  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/25/2011 15:50

Reported: 05/05/2011 18:45

10-57

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 31,000     | 31,000                     | 10,000                     | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 10,000     | 10,000                     | 2,100                      | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 31,000     | 31,000                     | 10,000                     | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | < 10,000     | 10,000                     | 2,100                      | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 10,000     | 10,000                     | 4,100                      | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 10,000     | 10,000                     | 2,100                      | 10              |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                            |                            |                 |

|               |                     |              |              |              |        |
|---------------|---------------------|--------------|--------------|--------------|--------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |        |
| 01643         | Aluminum            | 7429-90-5    | 15,100       | 24.4         | 6.14   |
| 06944         | Antimony            | 7440-36-0    | < 2.44       | 2.44         | 1.22   |
| 06935         | Arsenic             | 7440-38-2    | 21.1         | 2.44         | 1.16   |
| 06946         | Barium              | 7440-39-3    | 188          | 0.610        | 0.0488 |
| 06947         | Beryllium           | 7440-41-7    | 0.742        | 0.610        | 0.0830 |
| 06949         | Cadmium             | 7440-43-9    | 0.792        | 0.610        | 0.171  |
| 01650         | Calcium             | 7440-70-2    | 16,200       | 24.4         | 7.48   |
| 06951         | Chromium            | 7440-47-3    | 88.5         | 1.83         | 0.720  |
| 06952         | Cobalt              | 7440-48-4    | 8.42         | 0.610        | 0.232  |
| 06953         | Copper              | 7440-50-8    | 131          | 1.22         | 0.269  |
| 01654         | Iron                | 7439-89-6    | 20,100       | 24.4         | 5.75   |
| 06955         | Lead                | 7439-92-1    | 743          | 1.83         | 0.733  |
| 01657         | Magnesium           | 7439-95-4    | 6,350        | 12.2         | 3.10   |
| 06958         | Manganese           | 7439-96-5    | 596          | 0.610        | 0.0952 |
| 06961         | Nickel              | 7440-02-0    | 40.1         | 1.22         | 0.232  |
| 01662         | Potassium           | 7440-09-7    | 1,020        | 61.0         | 22.0   |
| 06936         | Selenium            | 7782-49-2    | < 2.44       | 2.44         | 1.20   |
| 06966         | Silver              | 7440-22-4    | < 0.610      | 0.610        | 0.220  |
| 01667         | Sodium              | 7440-23-5    | 177          | 122          | 45.5   |
| 06925         | Thallium            | 7440-28-0    | < 3.66       | 3.66         | 1.77   |
| 06971         | Vanadium            | 7440-62-2    | 91.7         | 0.610        | 0.232  |
| 06972         | Zinc                | 7440-66-6    | 260          | 2.44         | 0.806  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-57\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-57\_0-2'

**LLI Sample #** SW 6267996  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/21/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/25/2011 15:50

West Chester PA 19381

Reported: 05/05/2011 18:45

10-57

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                            |                            |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | 0.607      | 0.117                      | 0.0034                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | 19.7       | 0.50                       | 0.50                       | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111241AA    | 05/04/2011 12:33       | Nicholas R Rossi  | 607.74          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111624232 | 04/21/2011 11:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111624232 | 04/21/2011 11:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111624232 | 04/21/2011 11:45       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 111175708002 | 04/30/2011 13:48       | Chad A Moline     | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 111175708002 | 04/28/2011 08:45       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:34       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111175708002 | 05/03/2011 20:33       | John P Hook       | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111175708002 | 05/04/2011 13:34       | Joanne M Gates    | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-57\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259434 BH-10-57\_0-2'

**LLI Sample #** SW 6267996  
**LLI Group #** 1243734  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/21/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/25/2011 15:50

West Chester PA 19381

**Reported:** 05/05/2011 18:45

10-57

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis   |       | Analyst                 | Dilution |
|------------|---------------------|--------------------------|--------|--------------|------------|-------|-------------------------|----------|
|            |                     |                          |        |              | Date       | Time  |                         |          |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111175708002 | 05/03/2011 | 20:33 | John P Hook             | 1        |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111175708002 | 05/03/2011 | 20:33 | John P Hook             | 1        |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111175711001 | 04/28/2011 | 07:30 | Damary Valentin         | 1        |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111175708002 | 04/27/2011 | 20:11 | Annamaria<br>Stipkovits | 1        |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111175711001 | 04/27/2011 | 23:40 | Annamaria<br>Stipkovits | 1        |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11118820008A | 04/28/2011 | 19:48 | Scott W Freisher        | 1        |

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                             | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: A111182AA Sample number(s): 6267982-6267989 |              |             |           |              |          |           |                 |     |         |
| Benzene                                                   | < 5          | 5.          | 0.5       | ug/kg        | 92       | 91        | 80-120          | 2   | 30      |
| 1,2-Dibromoethane                                         | < 5          | 5.          | 1         | ug/kg        | 93       | 87        | 80-120          | 7   | 30      |
| 1,2-Dichloroethane                                        | < 5          | 5.          | 1         | ug/kg        | 92       | 87        | 71-129          | 6   | 30      |
| Ethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 89       | 89        | 80-120          | 0   | 30      |
| Isopropylbenzene                                          | < 5          | 5.          | 1         | ug/kg        | 90       | 89        | 76-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                               | < 5          | 5.          | 0.5       | ug/kg        | 94       | 87        | 74-121          | 8   | 30      |
| Toluene                                                   | < 5          | 5.          | 1         | ug/kg        | 91       | 91        | 80-120          | 0   | 30      |
| 1,2,4-Trimethylbenzene                                    | < 5          | 5.          | 1         | ug/kg        | 90       | 90        | 79-120          | 0   | 30      |
| 1,3,5-Trimethylbenzene                                    | < 5          | 5.          | 1         | ug/kg        | 91       | 91        | 78-120          | 0   | 30      |
| Xylene (Total)                                            | < 5          | 5.          | 1         | ug/kg        | 89       | 89        | 80-120          | 0   | 30      |
| Batch number: Q111241AA Sample number(s): 6267996         |              |             |           |              |          |           |                 |     |         |
| Acetone                                                   | < 1,000      | 1,000.      | 350       | ug/kg        | 72       | 70        | 32-209          | 3   | 30      |
| Benzene                                                   | < 250        | 250.        | 25        | ug/kg        | 108      | 108       | 80-120          | 0   | 30      |
| Bromodichloromethane                                      | < 250        | 250.        | 50        | ug/kg        | 102      | 102       | 78-120          | 0   | 30      |
| Bromoform                                                 | < 250        | 250.        | 50        | ug/kg        | 92       | 91        | 70-120          | 1   | 30      |
| Bromomethane                                              | < 250        | 250.        | 100       | ug/kg        | 106      | 109       | 32-162          | 2   | 30      |
| 2-Butanone                                                | < 500        | 500.        | 200       | ug/kg        | 83       | 81        | 46-153          | 2   | 30      |
| Carbon Disulfide                                          | < 250        | 250.        | 50        | ug/kg        | 101      | 100       | 67-122          | 1   | 30      |
| Carbon Tetrachloride                                      | < 250        | 250.        | 50        | ug/kg        | 104      | 105       | 69-122          | 1   | 30      |
| Chlorobenzene                                             | < 250        | 250.        | 50        | ug/kg        | 103      | 103       | 80-120          | 0   | 30      |
| Chloroethane                                              | < 250        | 250.        | 100       | ug/kg        | 113      | 115       | 37-154          | 1   | 30      |
| Chloroform                                                | < 250        | 250.        | 50        | ug/kg        | 105      | 105       | 80-120          | 0   | 30      |
| Chloromethane                                             | < 250        | 250.        | 100       | ug/kg        | 91       | 89        | 54-132          | 1   | 30      |
| Cyclohexane                                               | < 250        | 250.        | 50        | ug/kg        | 97       | 102       | 62-121          | 4   | 30      |
| 1,2-Dibromo-3-chloropropane                               | < 250        | 250.        | 100       | ug/kg        | 92       | 89        | 58-120          | 3   | 30      |
| Dibromochloromethane                                      | < 250        | 250.        | 50        | ug/kg        | 99       | 99        | 77-120          | 0   | 30      |
| 1,2-Dibromoethane                                         | < 250        | 250.        | 50        | ug/kg        | 104      | 102       | 80-120          | 2   | 30      |
| 1,2-Dichlorobenzene                                       | < 250        | 250.        | 50        | ug/kg        | 98       | 99        | 79-120          | 1   | 30      |
| 1,3-Dichlorobenzene                                       | < 250        | 250.        | 50        | ug/kg        | 99       | 100       | 78-120          | 1   | 30      |
| 1,4-Dichlorobenzene                                       | < 250        | 250.        | 50        | ug/kg        | 99       | 100       | 79-120          | 1   | 30      |
| Dichlorodifluoromethane                                   | < 250        | 250.        | 100       | ug/kg        | 63       | 66        | 20-120          | 4   | 30      |
| 1,1-Dichloroethane                                        | < 250        | 250.        | 50        | ug/kg        | 109      | 110       | 80-120          | 0   | 30      |
| 1,2-Dichloroethane                                        | < 250        | 250.        | 50        | ug/kg        | 106      | 106       | 71-129          | 0   | 30      |
| 1,1-Dichloroethene                                        | < 250        | 250.        | 50        | ug/kg        | 108      | 109       | 73-123          | 1   | 30      |
| cis-1,2-Dichloroethene                                    | < 250        | 250.        | 50        | ug/kg        | 106      | 107       | 80-120          | 1   | 30      |
| trans-1,2-Dichloroethene                                  | < 250        | 250.        | 50        | ug/kg        | 107      | 106       | 79-120          | 0   | 30      |
| 1,2-Dichloropropane                                       | < 250        | 250.        | 50        | ug/kg        | 104      | 103       | 80-120          | 1   | 30      |
| cis-1,3-Dichloropropene                                   | < 250        | 250.        | 50        | ug/kg        | 102      | 103       | 80-120          | 1   | 30      |
| trans-1,3-Dichloropropene                                 | < 250        | 250.        | 50        | ug/kg        | 100      | 98        | 77-120          | 1   | 30      |
| Ethylbenzene                                              | < 250        | 250.        | 50        | ug/kg        | 104      | 105       | 80-120          | 1   | 30      |
| Freon 113                                                 | < 500        | 500.        | 100       | ug/kg        | 94       | 99        | 61-126          | 6   | 30      |
| 2-Hexanone                                                | < 500        | 500.        | 150       | ug/kg        | 74       | 74        | 45-155          | 0   | 30      |
| Isopropylbenzene                                          | < 250        | 250.        | 50        | ug/kg        | 104      | 106       | 76-120          | 1   | 30      |
| Methyl Acetate                                            | < 250        | 250.        | 100       | ug/kg        | 101      | 97        | 61-152          | 3   | 30      |
| Methyl Tertiary Butyl Ether                               | < 250        | 250.        | 25        | ug/kg        | 105      | 105       | 74-121          | 0   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

| Analysis Name             | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| 4-Methyl-2-pentanone      | < 500        | 500.        | 150       | ug/kg        | 98       | 97        | 61-134          | 1   | 30      |
| Methylcyclohexane         | < 250        | 250.        | 50        | ug/kg        | 93       | 98        | 57-138          | 5   | 30      |
| Methylene Chloride        | < 250        | 250.        | 100       | ug/kg        | 107      | 106       | 76-124          | 0   | 30      |
| Styrene                   | < 250        | 250.        | 50        | ug/kg        | 105      | 104       | 76-120          | 1   | 30      |
| 1,1,2,2-Tetrachloroethane | < 250        | 250.        | 50        | ug/kg        | 98       | 98        | 71-123          | 0   | 30      |
| Tetrachloroethene         | < 250        | 250.        | 50        | ug/kg        | 104      | 104       | 77-120          | 0   | 30      |
| Toluene                   | < 250        | 250.        | 50        | ug/kg        | 106      | 105       | 80-120          | 1   | 30      |
| 1,2,4-Trichlorobenzene    | < 250        | 250.        | 50        | ug/kg        | 83       | 86        | 68-120          | 3   | 30      |
| 1,1,1-Trichloroethane     | < 250        | 250.        | 50        | ug/kg        | 106      | 107       | 71-125          | 0   | 30      |
| 1,1,2-Trichloroethane     | < 250        | 250.        | 50        | ug/kg        | 101      | 99        | 80-120          | 2   | 30      |
| Trichloroethene           | < 250        | 250.        | 50        | ug/kg        | 105      | 106       | 80-120          | 1   | 30      |
| Trichlorofluoromethane    | < 250        | 250.        | 100       | ug/kg        | 94       | 97        | 58-133          | 3   | 30      |
| Vinyl Chloride            | < 250        | 250.        | 50        | ug/kg        | 92       | 91        | 53-120          | 2   | 30      |
| Xylene (Total)            | < 250        | 250.        | 50        | ug/kg        | 105      | 106       | 80-120          | 0   | 30      |

Batch number: X111191AA

Sample number(s): 6267990-6267992, 6267995

|                             |      |     |     |       |     |  |        |
|-----------------------------|------|-----|-----|-------|-----|--|--------|
| Acetone                     | < 20 | 20. | 7   | ug/kg | 188 |  | 32-209 |
| Benzene                     | < 5  | 5.  | 0.5 | ug/kg | 95  |  | 80-120 |
| Bromodichloromethane        | < 5  | 5.  | 1   | ug/kg | 90  |  | 78-120 |
| Bromoform                   | < 5  | 5.  | 1   | ug/kg | 94  |  | 70-120 |
| Bromomethane                | < 5  | 5.  | 2   | ug/kg | 74  |  | 32-162 |
| 2-Butanone                  | < 10 | 10. | 4   | ug/kg | 109 |  | 46-153 |
| Carbon Disulfide            | < 5  | 5.  | 1   | ug/kg | 79  |  | 67-122 |
| Carbon Tetrachloride        | < 5  | 5.  | 1   | ug/kg | 91  |  | 69-122 |
| Chlorobenzene               | < 5  | 5.  | 1   | ug/kg | 99  |  | 80-120 |
| Chloroethane                | < 5  | 5.  | 2   | ug/kg | 74  |  | 37-154 |
| Chloroform                  | < 5  | 5.  | 1   | ug/kg | 95  |  | 80-120 |
| Chloromethane               | < 5  | 5.  | 2   | ug/kg | 85  |  | 54-132 |
| Cyclohexane                 | < 5  | 5.  | 1   | ug/kg | 84  |  | 62-121 |
| 1,2-Dibromo-3-chloropropane | < 5  | 5.  | 2   | ug/kg | 102 |  | 58-120 |
| Dibromochloromethane        | < 5  | 5.  | 1   | ug/kg | 95  |  | 77-120 |
| 1,2-Dibromoethane           | < 5  | 5.  | 1   | ug/kg | 101 |  | 80-120 |
| 1,2-Dichlorobenzene         | < 5  | 5.  | 1   | ug/kg | 96  |  | 79-120 |
| 1,3-Dichlorobenzene         | < 5  | 5.  | 1   | ug/kg | 95  |  | 78-120 |
| 1,4-Dichlorobenzene         | < 5  | 5.  | 1   | ug/kg | 100 |  | 79-120 |
| Dichlorodifluoromethane     | < 5  | 5.  | 2   | ug/kg | 74  |  | 20-120 |
| 1,1-Dichloroethane          | < 5  | 5.  | 1   | ug/kg | 95  |  | 80-120 |
| 1,2-Dichloroethane          | < 5  | 5.  | 1   | ug/kg | 95  |  | 71-129 |
| 1,1-Dichloroethene          | < 5  | 5.  | 1   | ug/kg | 91  |  | 73-123 |
| cis-1,2-Dichloroethene      | < 5  | 5.  | 1   | ug/kg | 98  |  | 80-120 |
| trans-1,2-Dichloroethene    | < 5  | 5.  | 1   | ug/kg | 96  |  | 79-120 |
| 1,2-Dichloropropane         | < 5  | 5.  | 1   | ug/kg | 93  |  | 80-120 |
| cis-1,3-Dichloropropene     | < 5  | 5.  | 1   | ug/kg | 89  |  | 80-120 |
| trans-1,3-Dichloropropene   | < 5  | 5.  | 1   | ug/kg | 86  |  | 77-120 |
| Ethylbenzene                | < 5  | 5.  | 1   | ug/kg | 98  |  | 80-120 |
| Freon 113                   | < 10 | 10. | 2   | ug/kg | 87  |  | 61-126 |
| 2-Hexanone                  | < 10 | 10. | 3   | ug/kg | 105 |  | 45-155 |
| Isopropylbenzene            | < 5  | 5.  | 1   | ug/kg | 101 |  | 76-120 |
| Methyl Acetate              | < 5  | 5.  | 2   | ug/kg | 132 |  | 61-152 |
| Methyl Tertiary Butyl Ether | < 5  | 5.  | 0.5 | ug/kg | 89  |  | 74-121 |
| 4-Methyl-2-pentanone        | < 10 | 10. | 3   | ug/kg | 105 |  | 61-134 |
| Methylcyclohexane           | < 5  | 5.  | 1   | ug/kg | 92  |  | 57-138 |
| Methylene Chloride          | < 5  | 5.  | 2   | ug/kg | 93  |  | 76-124 |
| Styrene                     | < 5  | 5.  | 1   | ug/kg | 95  |  | 76-120 |
| 1,1,2,2-Tetrachloroethane   | < 5  | 5.  | 1   | ug/kg | 99  |  | 71-123 |
| Tetrachloroethene           | < 5  | 5.  | 1   | ug/kg | 100 |  | 77-120 |
| Toluene                     | < 5  | 5.  | 1   | ug/kg | 97  |  | 80-120 |
| 1,2,4-Trichlorobenzene      | < 5  | 5.  | 1   | ug/kg | 93  |  | 68-120 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

| <u>Analysis Name</u>   | <u>Blank Result</u> | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| 1,1,1-Trichloroethane  | < 5                 | 5.                 | 1                | ug/kg               | 91              |                  | 71-125                 |            |                |
| 1,1,2-Trichloroethane  | < 5                 | 5.                 | 1                | ug/kg               | 94              |                  | 80-120                 |            |                |
| Trichloroethene        | < 5                 | 5.                 | 1                | ug/kg               | 95              |                  | 80-120                 |            |                |
| Trichlorofluoromethane | < 5                 | 5.                 | 2                | ug/kg               | 82              |                  | 58-133                 |            |                |
| 1,2,4-Trimethylbenzene | < 5                 | 5.                 | 1                | ug/kg               | 96              |                  | 79-120                 |            |                |
| 1,3,5-Trimethylbenzene | < 5                 | 5.                 | 1                | ug/kg               | 97              |                  | 78-120                 |            |                |
| Vinyl Chloride         | < 5                 | 5.                 | 1                | ug/kg               | 85              |                  | 53-120                 |            |                |
| Xylene (Total)         | < 5                 | 5.                 | 1                | ug/kg               | 101             |                  | 80-120                 |            |                |

|                             |                                   |     |     |       |     |     |        |    |    |
|-----------------------------|-----------------------------------|-----|-----|-------|-----|-----|--------|----|----|
| Batch number: X111231AA     | Sample number(s): 6267993-6267994 |     |     |       |     |     |        |    |    |
| Acetone                     | < 20                              | 20. | 7   | ug/kg | 98  | 85  | 32-209 | 14 | 30 |
| Benzene                     | < 5                               | 5.  | 0.5 | ug/kg | 100 | 99  | 80-120 | 1  | 30 |
| Bromodichloromethane        | < 5                               | 5.  | 1   | ug/kg | 93  | 92  | 78-120 | 2  | 30 |
| Bromoform                   | < 5                               | 5.  | 1   | ug/kg | 94  | 86  | 70-120 | 8  | 30 |
| Bromomethane                | < 5                               | 5.  | 2   | ug/kg | 82  | 85  | 32-162 | 3  | 30 |
| 2-Butanone                  | < 10                              | 10. | 4   | ug/kg | 97  | 79  | 46-153 | 21 | 30 |
| Carbon Disulfide            | < 5                               | 5.  | 1   | ug/kg | 88  | 86  | 67-122 | 2  | 30 |
| Carbon Tetrachloride        | < 5                               | 5.  | 1   | ug/kg | 99  | 97  | 69-122 | 2  | 30 |
| Chlorobenzene               | < 5                               | 5.  | 1   | ug/kg | 101 | 98  | 80-120 | 3  | 30 |
| Chloroethane                | < 5                               | 5.  | 2   | ug/kg | 79  | 83  | 37-154 | 5  | 30 |
| Chloroform                  | < 5                               | 5.  | 1   | ug/kg | 98  | 97  | 80-120 | 1  | 30 |
| Chloromethane               | < 5                               | 5.  | 2   | ug/kg | 89  | 88  | 54-132 | 2  | 30 |
| Cyclohexane                 | < 5                               | 5.  | 1   | ug/kg | 92  | 89  | 62-121 | 4  | 30 |
| 1,2-Dibromo-3-chloropropane | < 5                               | 5.  | 2   | ug/kg | 88  | 74  | 58-120 | 17 | 30 |
| Dibromochloromethane        | < 5                               | 5.  | 1   | ug/kg | 97  | 91  | 77-120 | 6  | 30 |
| 1,2-Dibromoethane           | < 5                               | 5.  | 1   | ug/kg | 99  | 91  | 80-120 | 9  | 30 |
| 1,2-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 97  | 97  | 79-120 | 1  | 30 |
| 1,3-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 95  | 93  | 78-120 | 2  | 30 |
| 1,4-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 95  | 97  | 79-120 | 3  | 30 |
| Dichlorodifluoromethane     | < 5                               | 5.  | 2   | ug/kg | 86  | 83  | 20-120 | 3  | 30 |
| 1,1-Dichloroethane          | < 5                               | 5.  | 1   | ug/kg | 96  | 98  | 80-120 | 3  | 30 |
| 1,2-Dichloroethane          | < 5                               | 5.  | 1   | ug/kg | 97  | 93  | 71-129 | 5  | 30 |
| 1,1-Dichloroethene          | < 5                               | 5.  | 1   | ug/kg | 99  | 97  | 73-123 | 2  | 30 |
| cis-1,2-Dichloroethene      | < 5                               | 5.  | 1   | ug/kg | 101 | 100 | 80-120 | 1  | 30 |
| trans-1,2-Dichloroethene    | < 5                               | 5.  | 1   | ug/kg | 101 | 99  | 79-120 | 2  | 30 |
| 1,2-Dichloropropane         | < 5                               | 5.  | 1   | ug/kg | 95  | 94  | 80-120 | 2  | 30 |
| cis-1,3-Dichloropropene     | < 5                               | 5.  | 1   | ug/kg | 91  | 90  | 80-120 | 2  | 30 |
| trans-1,3-Dichloropropene   | < 5                               | 5.  | 1   | ug/kg | 90  | 86  | 77-120 | 5  | 30 |
| Ethylbenzene                | < 5                               | 5.  | 1   | ug/kg | 99  | 97  | 80-120 | 2  | 30 |
| Freon 113                   | < 10                              | 10. | 2   | ug/kg | 99  | 95  | 61-126 | 4  | 30 |
| 2-Hexanone                  | < 10                              | 10. | 3   | ug/kg | 89  | 74  | 45-155 | 19 | 30 |
| Isopropylbenzene            | < 5                               | 5.  | 1   | ug/kg | 103 | 100 | 76-120 | 3  | 30 |
| Methyl Acetate              | < 5                               | 5.  | 2   | ug/kg | 100 | 86  | 61-152 | 16 | 30 |
| Methyl Tertiary Butyl Ether | < 5                               | 5.  | 0.5 | ug/kg | 90  | 86  | 74-121 | 5  | 30 |
| 4-Methyl-2-pentanone        | < 10                              | 10. | 3   | ug/kg | 94  | 78  | 61-134 | 19 | 30 |
| Methylcyclohexane           | < 5                               | 5.  | 1   | ug/kg | 101 | 96  | 57-138 | 5  | 30 |
| Methylene Chloride          | < 5                               | 5.  | 2   | ug/kg | 98  | 97  | 76-124 | 1  | 30 |
| Styrene                     | < 5                               | 5.  | 1   | ug/kg | 96  | 93  | 76-120 | 3  | 30 |
| 1,1,2,2-Tetrachloroethane   | < 5                               | 5.  | 1   | ug/kg | 88  | 82  | 71-123 | 8  | 30 |
| Tetrachloroethene           | < 5                               | 5.  | 1   | ug/kg | 106 | 102 | 77-120 | 3  | 30 |
| Toluene                     | < 5                               | 5.  | 1   | ug/kg | 100 | 96  | 80-120 | 4  | 30 |
| 1,2,4-Trichlorobenzene      | < 5                               | 5.  | 1   | ug/kg | 91  | 90  | 68-120 | 1  | 30 |
| 1,1,1-Trichloroethane       | < 5                               | 5.  | 1   | ug/kg | 93  | 91  | 71-125 | 2  | 30 |
| 1,1,2-Trichloroethane       | < 5                               | 5.  | 1   | ug/kg | 93  | 90  | 80-120 | 3  | 30 |
| Trichloroethene             | < 5                               | 5.  | 1   | ug/kg | 101 | 97  | 80-120 | 4  | 30 |
| Trichlorofluoromethane      | < 5                               | 5.  | 2   | ug/kg | 92  | 89  | 58-133 | 3  | 30 |
| Vinyl Chloride              | < 5                               | 5.  | 1   | ug/kg | 91  | 90  | 53-120 | 1  | 30 |
| Xylene (Total)              | < 5                               | 5.  | 1   | ug/kg | 102 | 100 | 80-120 | 3  | 30 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

| <u>Analysis Name</u>         | <u>Blank Result</u>               | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Batch number: 11116SLD026    | Sample number(s): 6267982-6267987 |                    |                  |                     |                 |                  |                        |            |                |
| Anthracene                   | < 170                             | 170.               | 33               | ug/kg               | 92              |                  | 83-111                 |            |                |
| Benzo(a)anthracene           | < 170                             | 170.               | 33               | ug/kg               | 94              |                  | 82-111                 |            |                |
| Benzo(a)pyrene               | < 170                             | 170.               | 33               | ug/kg               | 80              |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene         | < 170                             | 170.               | 33               | ug/kg               | 88              |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene         | < 170                             | 170.               | 33               | ug/kg               | 83              |                  | 63-130                 |            |                |
| Chrysene                     | < 170                             | 170.               | 33               | ug/kg               | 92              |                  | 81-111                 |            |                |
| Fluorene                     | < 170                             | 170.               | 33               | ug/kg               | 95              |                  | 81-117                 |            |                |
| Naphthalene                  | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 83-112                 |            |                |
| Phenanthrene                 | < 170                             | 170.               | 33               | ug/kg               | 88              |                  | 83-109                 |            |                |
| Pyrene                       | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 80-121                 |            |                |
| Batch number: 11117SLJ026    | Sample number(s): 6267992-6267996 |                    |                  |                     |                 |                  |                        |            |                |
| Acenaphthene                 | < 170                             | 170.               | 33               | ug/kg               | 99              |                  | 83-111                 |            |                |
| Acenaphthylene               | < 170                             | 170.               | 33               | ug/kg               | 105             |                  | 68-120                 |            |                |
| Acetophenone                 | < 170                             | 170.               | 67               | ug/kg               | 95              |                  | 70-106                 |            |                |
| Anthracene                   | < 170                             | 170.               | 33               | ug/kg               | 98              |                  | 83-111                 |            |                |
| Atrazine                     | < 170                             | 170.               | 33               | ug/kg               | 96              |                  | 69-122                 |            |                |
| Benzaldehyde                 | < 170                             | 170.               | 67               | ug/kg               | 56              |                  | 10-74                  |            |                |
| Benzo(a)anthracene           | < 170                             | 170.               | 33               | ug/kg               | 97              |                  | 82-111                 |            |                |
| Benzo(a)pyrene               | < 170                             | 170.               | 33               | ug/kg               | 97              |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene         | < 170                             | 170.               | 33               | ug/kg               | 95              |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene         | < 170                             | 170.               | 33               | ug/kg               | 93              |                  | 63-130                 |            |                |
| Benzo(k)fluoranthene         | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 71-135                 |            |                |
| 1,1'-Biphenyl                | < 170                             | 170.               | 33               | ug/kg               | 97              |                  | 82-106                 |            |                |
| 4-Bromophenyl-phenylether    | < 170                             | 170.               | 33               | ug/kg               | 94              |                  | 79-117                 |            |                |
| Butylbenzylphthalate         | < 170                             | 170.               | 67               | ug/kg               | 99              |                  | 83-122                 |            |                |
| Di-n-butylphthalate          | < 170                             | 170.               | 67               | ug/kg               | 96              |                  | 79-112                 |            |                |
| Caprolactam                  | < 170                             | 170.               | 33               | ug/kg               | 94              |                  | 65-113                 |            |                |
| Carbazole                    | < 170                             | 170.               | 33               | ug/kg               | 95              |                  | 83-111                 |            |                |
| 4-Chloro-3-methylphenol      | < 170                             | 170.               | 67               | ug/kg               | 99              |                  | 74-119                 |            |                |
| 4-Chloroaniline              | < 170                             | 170.               | 67               | ug/kg               | 58              |                  | 10-97                  |            |                |
| bis(2-Chloroethoxy)methane   | < 170                             | 170.               | 33               | ug/kg               | 99              |                  | 82-113                 |            |                |
| bis(2-Chloroethyl)ether      | < 170                             | 170.               | 33               | ug/kg               | 101             |                  | 77-115                 |            |                |
| 2-Chloronaphthalene          | < 170                             | 170.               | 33               | ug/kg               | 88              |                  | 59-139                 |            |                |
| 2-Chlorophenol               | < 170                             | 170.               | 33               | ug/kg               | 103             |                  | 83-119                 |            |                |
| 4-Chlorophenyl-phenylether   | < 170                             | 170.               | 33               | ug/kg               | 98              |                  | 79-110                 |            |                |
| 2,2'-oxybis(1-Chloropropane) | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 67-130                 |            |                |
| Chrysene                     | < 170                             | 170.               | 33               | ug/kg               | 96              |                  | 81-111                 |            |                |
| Dibenz(a,h)anthracene        | < 170                             | 170.               | 33               | ug/kg               | 96              |                  | 67-129                 |            |                |
| Dibenzofuran                 | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 85-110                 |            |                |
| 3,3'-Dichlorobenzidine       | < 330                             | 330.               | 100              | ug/kg               | 36              |                  | 35-94                  |            |                |
| 2,4-Dichlorophenol           | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 87-117                 |            |                |
| Diethylphthalate             | < 170                             | 170.               | 67               | ug/kg               | 98              |                  | 82-113                 |            |                |
| 2,4-Dimethylphenol           | < 170                             | 170.               | 67               | ug/kg               | 101             |                  | 83-120                 |            |                |
| Dimethylphthalate            | < 170                             | 170.               | 67               | ug/kg               | 98              |                  | 85-111                 |            |                |
| 4,6-Dinitro-2-methylphenol   | < 500                             | 500.               | 170              | ug/kg               | 84              |                  | 60-113                 |            |                |
| 2,4-Dinitrophenol            | < 1,000                           | 1,000.             | 330              | ug/kg               | 80              |                  | 51-124                 |            |                |
| 2,4-Dinitrotoluene           | < 170                             | 170.               | 67               | ug/kg               | 101             |                  | 80-116                 |            |                |
| 2,6-Dinitrotoluene           | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 79-115                 |            |                |
| bis(2-Ethylhexyl)phthalate   | < 330                             | 330.               | 67               | ug/kg               | 95              |                  | 80-119                 |            |                |
| Fluoranthene                 | < 170                             | 170.               | 33               | ug/kg               | 89              |                  | 80-113                 |            |                |
| Fluorene                     | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 81-117                 |            |                |
| Hexachlorobenzene            | < 170                             | 170.               | 33               | ug/kg               | 97              |                  | 79-115                 |            |                |
| Hexachlorobutadiene          | < 170                             | 170.               | 67               | ug/kg               | 92              |                  | 70-112                 |            |                |
| Hexachlorocyclopentadiene    | < 500                             | 500.               | 170              | ug/kg               | 90              |                  | 64-127                 |            |                |
| Hexachloroethane             | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 76-109                 |            |                |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

| <u>Analysis Name</u>       | <u>Blank Result</u> | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Indeno(1,2,3-cd)pyrene     | < 170               | 170.               | 33               | ug/kg               | 95              |                  | 64-128                 |            |                |
| Isophorone                 | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 72-107                 |            |                |
| 2-Methylnaphthalene        | < 170               | 170.               | 33               | ug/kg               | 93              |                  | 79-110                 |            |                |
| 2-Methylphenol             | < 170               | 170.               | 67               | ug/kg               | 102             |                  | 80-119                 |            |                |
| 4-Methylphenol             | < 170               | 170.               | 67               | ug/kg               | 98              |                  | 74-116                 |            |                |
| Naphthalene                | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 83-112                 |            |                |
| 2-Nitroaniline             | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 83-118                 |            |                |
| 3-Nitroaniline             | < 170               | 170.               | 67               | ug/kg               | 96              |                  | 66-114                 |            |                |
| 4-Nitroaniline             | < 170               | 170.               | 67               | ug/kg               | 76              |                  | 52-92                  |            |                |
| Nitrobenzene               | < 170               | 170.               | 33               | ug/kg               | 96              |                  | 78-122                 |            |                |
| 2-Nitrophenol              | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 81-114                 |            |                |
| 4-Nitrophenol              | < 500               | 500.               | 170              | ug/kg               | 86              |                  | 57-131                 |            |                |
| N-Nitroso-di-n-propylamine | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 70-113                 |            |                |
| N-Nitrosodiphenylamine     | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 86-112                 |            |                |
| Di-n-octylphthalate        | < 170               | 170.               | 67               | ug/kg               | 101             |                  | 65-141                 |            |                |
| Pentachlorophenol          | < 500               | 500.               | 170              | ug/kg               | 89              |                  | 50-133                 |            |                |
| Phenanthrene               | < 170               | 170.               | 33               | ug/kg               | 94              |                  | 83-109                 |            |                |
| Phenol                     | < 170               | 170.               | 33               | ug/kg               | 103             |                  | 74-115                 |            |                |
| Pyrene                     | < 170               | 170.               | 33               | ug/kg               | 94              |                  | 80-121                 |            |                |
| 2,4,5-Trichlorophenol      | < 170               | 170.               | 67               | ug/kg               | 99              |                  | 84-109                 |            |                |
| 2,4,6-Trichlorophenol      | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 88-114                 |            |                |

|                           |                                   |      |    |       |     |  |        |  |  |
|---------------------------|-----------------------------------|------|----|-------|-----|--|--------|--|--|
| Batch number: 11118SLE026 | Sample number(s): 6267988-6267991 |      |    |       |     |  |        |  |  |
| Anthracene                | < 170                             | 170. | 33 | ug/kg | 97  |  | 83-111 |  |  |
| Benzo(a)anthracene        | < 170                             | 170. | 33 | ug/kg | 98  |  | 82-111 |  |  |
| Benzo(a)pyrene            | < 170                             | 170. | 33 | ug/kg | 103 |  | 63-138 |  |  |
| Benzo(b)fluoranthene      | < 170                             | 170. | 33 | ug/kg | 110 |  | 61-133 |  |  |
| Benzo(g,h,i)perylene      | < 170                             | 170. | 33 | ug/kg | 106 |  | 63-130 |  |  |
| Chrysene                  | < 170                             | 170. | 33 | ug/kg | 97  |  | 81-111 |  |  |
| Fluorene                  | < 170                             | 170. | 33 | ug/kg | 101 |  | 81-117 |  |  |
| Naphthalene               | < 170                             | 170. | 33 | ug/kg | 94  |  | 83-112 |  |  |
| Phenanthrene              | < 170                             | 170. | 33 | ug/kg | 95  |  | 83-109 |  |  |
| Pyrene                    | < 170                             | 170. | 33 | ug/kg | 97  |  | 80-121 |  |  |

|                             |                                   |       |        |       |    |  |        |  |  |
|-----------------------------|-----------------------------------|-------|--------|-------|----|--|--------|--|--|
| Batch number: 111171026001A | Sample number(s): 6267982-6267991 |       |        |       |    |  |        |  |  |
| Lead                        | < 0.198                           | 0.198 | 0.0103 | mg/kg | 92 |  | 83-110 |  |  |

|                            |                                   |       |        |       |     |  |        |  |  |
|----------------------------|-----------------------------------|-------|--------|-------|-----|--|--------|--|--|
| Batch number: 111175708002 | Sample number(s): 6267992-6267996 |       |        |       |     |  |        |  |  |
| Aluminum                   | < 20.0                            | 20.0  | 5.03   | mg/kg | 98  |  | 61-110 |  |  |
| Antimony                   | < 2.00                            | 2.00  | 1.00   | mg/kg | 101 |  | 38-150 |  |  |
| Arsenic                    | < 2.00                            | 2.00  | 0.950  | mg/kg | 99  |  | 90-110 |  |  |
| Barium                     | < 0.500                           | 0.500 | 0.0400 | mg/kg | 105 |  | 90-117 |  |  |
| Beryllium                  | < 0.500                           | 0.500 | 0.0680 | mg/kg | 101 |  | 87-110 |  |  |
| Cadmium                    | < 0.500                           | 0.500 | 0.140  | mg/kg | 100 |  | 90-114 |  |  |
| Calcium                    | < 20.0                            | 20.0  | 6.13   | mg/kg | 102 |  | 88-110 |  |  |
| Chromium                   | < 1.50                            | 1.50  | 0.590  | mg/kg | 102 |  | 85-110 |  |  |
| Cobalt                     | < 0.500                           | 0.500 | 0.190  | mg/kg | 101 |  | 90-114 |  |  |
| Copper                     | < 1.00                            | 1.00  | 0.220  | mg/kg | 103 |  | 83-112 |  |  |
| Iron                       | < 20.0                            | 20.0  | 4.71   | mg/kg | 102 |  | 61-110 |  |  |
| Lead                       | < 1.50                            | 1.50  | 0.600  | mg/kg | 98  |  | 80-120 |  |  |
| Magnesium                  | < 10.0                            | 10.0  | 2.54   | mg/kg | 102 |  | 82-110 |  |  |
| Manganese                  | < 0.500                           | 0.500 | 0.0780 | mg/kg | 105 |  | 89-112 |  |  |
| Nickel                     | < 1.00                            | 1.00  | 0.190  | mg/kg | 100 |  | 90-114 |  |  |
| Potassium                  | < 50.0                            | 50.0  | 18.0   | mg/kg | 104 |  | 78-110 |  |  |
| Selenium                   | < 2.00                            | 2.00  | 0.980  | mg/kg | 100 |  | 57-110 |  |  |
| Silver                     | < 0.500                           | 0.500 | 0.180  | mg/kg | 103 |  | 86-111 |  |  |
| Sodium                     | < 100                             | 100.  | 37.3   | mg/kg | 99  |  | 87-110 |  |  |
| Thallium                   | < 3.00                            | 3.00  | 1.45   | mg/kg | 105 |  | 90-116 |  |  |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

| <u>Analysis Name</u>       | <u>Blank Result</u>               | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Vanadium                   | < 0.500                           | 0.500              | 0.190            | mg/kg               | 99              |                  | 79-110                 |            |                |
| Zinc                       | < 2.00                            | 2.00               | 0.660            | mg/kg               | 96              |                  | 90-110                 |            |                |
| Batch number: 111175711001 | Sample number(s): 6267992-6267996 |                    |                  |                     |                 |                  |                        |            |                |
| Mercury                    | < 0.0972                          | 0.0972             | 0.0028           | mg/kg               | 95              |                  | 88-123                 |            |                |
| Batch number: 11118820008A | Sample number(s): 6267982-6267996 |                    |                  |                     |                 |                  |                        |            |                |
| Moisture                   |                                   |                    |                  |                     | 100             |                  | 99-101                 |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS %REC</u>                                           | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|-----------------------------|----------------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: X111191AA     | Sample number(s): 6267990-6267992,6267995 UNSPK: P266108 |                 |                      |            |                |                 |                 |                |                    |
| Acetone                     | 145                                                      | 92              | 15-210               | 67*        | 30             |                 |                 |                |                    |
| Benzene                     | 62                                                       | 107             | 55-143               | 14         | 30             |                 |                 |                |                    |
| Bromodichloromethane        | 85                                                       | 92              | 53-136               | 27         | 30             |                 |                 |                |                    |
| Bromoform                   | 58                                                       | 87              | 38-124               | 6          | 30             |                 |                 |                |                    |
| Bromomethane                | 74                                                       | 76              | 42-168               | 31*        | 30             |                 |                 |                |                    |
| 2-Butanone                  | 94                                                       | 98              | 37-163               | 29         | 30             |                 |                 |                |                    |
| Carbon Disulfide            | 76                                                       | 75              | 48-146               | 32*        | 30             |                 |                 |                |                    |
| Carbon Tetrachloride        | 75                                                       | 94              | 45-153               | 12         | 30             |                 |                 |                |                    |
| Chlorobenzene               | 69                                                       | 101             | 49-135               | 4          | 30             |                 |                 |                |                    |
| Chloroethane                | 101                                                      | 72              | 39-152               | 66*        | 30             |                 |                 |                |                    |
| Chloroform                  | 83                                                       | 95              | 61-142               | 21         | 30             |                 |                 |                |                    |
| Chloromethane               | 86                                                       | 105             | 51-163               | 14         | 30             |                 |                 |                |                    |
| Cyclohexane                 | 62                                                       | 95              | 57-151               | 8          | 30             |                 |                 |                |                    |
| 1,2-Dibromo-3-chloropropane | 104                                                      | 90              | 30-139               | 47*        | 30             |                 |                 |                |                    |
| Dibromochloromethane        | 75                                                       | 96              | 51-128               | 10         | 30             |                 |                 |                |                    |
| 1,2-Dibromoethane           | 78                                                       | 103             | 54-129               | 6          | 30             |                 |                 |                |                    |
| 1,2-Dichlorobenzene         | 37                                                       | 86              | 36-133               | 50*        | 30             |                 |                 |                |                    |
| 1,3-Dichlorobenzene         | 39                                                       | 88              | 34-134               | 45*        | 30             |                 |                 |                |                    |
| 1,4-Dichlorobenzene         | 33*                                                      | 93              | 35-136               | 67*        | 30             |                 |                 |                |                    |
| Dichlorodifluoromethane     | 75                                                       | 91              | 26-151               | 15         | 30             |                 |                 |                |                    |
| 1,1-Dichloroethane          | 99                                                       | 95              | 63-142               | 38*        | 30             |                 |                 |                |                    |
| 1,2-Dichloroethane          | 55685<br>(2)                                             | -747<br>(2)     | 68-131               | 197*       | 30             |                 |                 |                |                    |
| 1,1-Dichloroethene          | 86                                                       | 92              | 61-149               | 27         | 30             |                 |                 |                |                    |
| cis-1,2-Dichloroethene      | 199*                                                     | 95              | 60-136               | 99*        | 30             |                 |                 |                |                    |
| trans-1,2-Dichloroethene    | 89                                                       | 94              | 59-142               | 28         | 30             |                 |                 |                |                    |
| 1,2-Dichloropropane         | 87                                                       | 95              | 62-135               | 25         | 30             |                 |                 |                |                    |
| cis-1,3-Dichloropropene     | 80                                                       | 94              | 51-131               | 18         | 30             |                 |                 |                |                    |
| trans-1,3-Dichloropropene   | 81                                                       | 93              | 49-129               | 20         | 30             |                 |                 |                |                    |
| Ethylbenzene                | 92                                                       | 101             | 44-141               | 26         | 30             |                 |                 |                |                    |
| Freon 113                   | 70                                                       | 88              | 56-156               | 11         | 30             |                 |                 |                |                    |
| 2-Hexanone                  | 82                                                       | 106             | 32-160               | 9          | 30             |                 |                 |                |                    |
| Isopropylbenzene            | 163*                                                     | 64              | 38-144               | 89*        | 30             |                 |                 |                |                    |
| Methyl Acetate              | 158                                                      | 99              | 48-161               | 77*        | 30             |                 |                 |                |                    |
| Methyl Tertiary Butyl Ether | 77                                                       | 85              | 55-129               | 24         | 30             |                 |                 |                |                    |
| 4-Methyl-2-pentanone        | 81                                                       | 98              | 46-139               | 15         | 30             |                 |                 |                |                    |
| Methylcyclohexane           | 60                                                       | 88              | 39-168               | 3          | 30             |                 |                 |                |                    |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>      | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup</u> <u>RPD</u><br><u>Max</u> |
|---------------------------|--------------------------|---------------------------|--------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|-------------------------------------|
| Methylene Chloride        | 117                      | 72                        | 61-141                         | 69*                      | 30                       |                           |                           |                          |                                     |
| Styrene                   | 60                       | 86                        | 35-134                         | 2                        | 30                       |                           |                           |                          |                                     |
| 1,1,2,2-Tetrachloroethane | 78                       | 108                       | 40-152                         | 3                        | 30                       |                           |                           |                          |                                     |
| Tetrachloroethene         | 89                       | 103                       | 42-149                         | 19                       | 30                       |                           |                           |                          |                                     |
| Toluene                   | 160*                     | 115                       | 50-146                         | 63*                      | 30                       |                           |                           |                          |                                     |
| 1,2,4-Trichlorobenzene    | 20                       | 44                        | 10-136                         | 41*                      | 30                       |                           |                           |                          |                                     |
| 1,1,1-Trichloroethane     | 79                       | 95                        | 64-142                         | 16                       | 30                       |                           |                           |                          |                                     |
| 1,1,2-Trichloroethane     | 115                      | 119                       | 54-139                         | 30                       | 30                       |                           |                           |                          |                                     |
| Trichloroethene           | 2544*                    | 101                       | 53-144                         | 189*                     | 30                       |                           |                           |                          |                                     |
| Trichlorofluoromethane    | 85                       | 101                       | 47-163                         | 17                       | 30                       |                           |                           |                          |                                     |
| 1,2,4-Trimethylbenzene    | 88                       | 89                        | 37-149                         | 29                       | 30                       |                           |                           |                          |                                     |
| 1,3,5-Trimethylbenzene    | 63                       | 97                        | 38-150                         | 9                        | 30                       |                           |                           |                          |                                     |
| Vinyl Chloride            | 288*                     | 111                       | 50-154                         | 114*                     | 30                       |                           |                           |                          |                                     |
| Xylene (Total)            | 87                       | 103                       | 44-136                         | 18                       | 30                       |                           |                           |                          |                                     |

|                           |                                                  |      |        |    |    |
|---------------------------|--------------------------------------------------|------|--------|----|----|
| Batch number: 11116SLD026 | Sample number(s): 6267982-6267987 UNSPK: P265762 |      |        |    |    |
| Anthracene                | 108                                              | 104  | 40-147 | 3  | 30 |
| Benzo(a)anthracene        | 107                                              | 95   | 32-150 | 8  | 30 |
| Benzo(a)pyrene            | 98                                               | 82   | 57-129 | 11 | 30 |
| Benzo(b)fluoranthene      | 92                                               | 88   | 53-131 | 3  | 30 |
| Benzo(g,h,i)perylene      | 114                                              | 86   | 60-123 | 13 | 30 |
| Chrysene                  | 122*                                             | 117* | 76-114 | 3  | 30 |
| Fluorene                  | 99                                               | 94   | 46-137 | 5  | 30 |
| Naphthalene               | 175*                                             | 174* | 52-132 | 1  | 30 |
| Phenanthrene              | 127                                              | 132  | 34-147 | 1  | 30 |
| Pyrene                    | 125*                                             | 123  | 76-124 | 1  | 30 |

|                              |                                                  |     |        |    |    |
|------------------------------|--------------------------------------------------|-----|--------|----|----|
| Batch number: 11117SLJ026    | Sample number(s): 6267992-6267996 UNSPK: P267094 |     |        |    |    |
| Acenaphthene                 | 89                                               | 92  | 51-135 | 3  | 30 |
| Acenaphthylene               | 93                                               | 95  | 47-137 | 2  | 30 |
| Acetophenone                 | 96                                               | 97  | 38-136 | 2  | 30 |
| Anthracene                   | 90                                               | 91  | 40-147 | 1  | 30 |
| Atrazine                     | 73                                               | 75  | 52-124 | 3  | 30 |
| Benzaldehyde                 | 71                                               | 80  | 10-85  | 11 | 30 |
| Benzo(a)anthracene           | 91                                               | 91  | 32-150 | 0  | 30 |
| Benzo(a)pyrene               | 89                                               | 87  | 57-129 | 2  | 30 |
| Benzo(b)fluoranthene         | 87                                               | 87  | 53-131 | 0  | 30 |
| Benzo(g,h,i)perylene         | 93                                               | 94  | 60-123 | 1  | 30 |
| Benzo(k)fluoranthene         | 91                                               | 90  | 61-131 | 2  | 30 |
| 1,1'-Biphenyl                | 87                                               | 88  | 51-127 | 1  | 30 |
| 4-Bromophenyl-phenylether    | 88                                               | 90  | 58-136 | 2  | 30 |
| Butylbenzylphthalate         | 91                                               | 96  | 42-155 | 5  | 30 |
| Di-n-butylphthalate          | 91                                               | 92  | 55-131 | 1  | 30 |
| Caprolactam                  | 87                                               | 86  | 36-137 | 1  | 30 |
| Carbazole                    | 90                                               | 90  | 36-148 | 0  | 30 |
| 4-Chloro-3-methylphenol      | 95                                               | 98  | 33-144 | 3  | 30 |
| 4-Chloroaniline              | 47                                               | 55  | 11-114 | 16 | 30 |
| bis(2-Chloroethoxy)methane   | 91                                               | 94  | 60-118 | 3  | 30 |
| bis(2-Chloroethyl)ether      | 98                                               | 97  | 45-139 | 1  | 30 |
| 2-Chloronaphthalene          | 84                                               | 81  | 43-149 | 3  | 30 |
| 2-Chlorophenol               | 100                                              | 106 | 53-141 | 6  | 30 |
| 4-Chlorophenyl-phenylether   | 89                                               | 92  | 57-127 | 3  | 30 |
| 2,2'-oxybis(1-Chloropropane) | 94                                               | 96  | 51-124 | 2  | 30 |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>       | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|----------------------------|--------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Chrysene                   | 90                       | 93                        | 76-114                         | 3          | 30                       |                           |                           |                          |                              |
| Dibenz(a,h)anthracene      | 91                       | 92                        | 37-151                         | 1          | 30                       |                           |                           |                          |                              |
| Dibenzofuran               | 90                       | 93                        | 38-148                         | 3          | 30                       |                           |                           |                          |                              |
| 3,3'-Dichlorobenzidine     | 0*                       | 0*                        | 10-143                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dichlorophenol         | 93                       | 98                        | 48-141                         | 5          | 30                       |                           |                           |                          |                              |
| Diethylphthalate           | 88                       | 93                        | 52-130                         | 5          | 30                       |                           |                           |                          |                              |
| 2,4-Dimethylphenol         | 95                       | 97                        | 27-143                         | 2          | 30                       |                           |                           |                          |                              |
| Dimethylphthalate          | 89                       | 90                        | 49-134                         | 2          | 30                       |                           |                           |                          |                              |
| 4,6-Dinitro-2-methylphenol | 84                       | 87                        | 10-148                         | 3          | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrophenol          | 93                       | 100                       | 20-143                         | 7          | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrotoluene         | 91                       | 91                        | 27-147                         | 1          | 30                       |                           |                           |                          |                              |
| 2,6-Dinitrotoluene         | 91                       | 94                        | 44-140                         | 3          | 30                       |                           |                           |                          |                              |
| bis(2-Ethylhexyl)phthalate | 92                       | 99                        | 38-151                         | 8          | 30                       |                           |                           |                          |                              |
| Fluoranthene               | 85                       | 86                        | 48-122                         | 1          | 30                       |                           |                           |                          |                              |
| Fluorene                   | 91                       | 92                        | 46-137                         | 2          | 30                       |                           |                           |                          |                              |
| Hexachlorobenzene          | 90                       | 89                        | 53-137                         | 1          | 30                       |                           |                           |                          |                              |
| Hexachlorobutadiene        | 83                       | 82                        | 52-124                         | 0          | 30                       |                           |                           |                          |                              |
| Hexachlorocyclopentadiene  | 72                       | 77                        | 10-153                         | 7          | 30                       |                           |                           |                          |                              |
| Hexachloroethane           | 81                       | 84                        | 71-104                         | 4          | 30                       |                           |                           |                          |                              |
| Indeno(1,2,3-cd)pyrene     | 91                       | 92                        | 61-123                         | 1          | 30                       |                           |                           |                          |                              |
| Isophorone                 | 91                       | 92                        | 54-122                         | 1          | 30                       |                           |                           |                          |                              |
| 2-Methylnaphthalene        | 87                       | 88                        | 34-139                         | 2          | 30                       |                           |                           |                          |                              |
| 2-Methylphenol             | 99                       | 104                       | 30-145                         | 4          | 30                       |                           |                           |                          |                              |
| 4-Methylphenol             | 98                       | 101                       | 36-149                         | 2          | 30                       |                           |                           |                          |                              |
| Naphthalene                | 88                       | 91                        | 52-132                         | 3          | 30                       |                           |                           |                          |                              |
| 2-Nitroaniline             | 90                       | 95                        | 46-146                         | 5          | 30                       |                           |                           |                          |                              |
| 3-Nitroaniline             | 69                       | 72                        | 34-134                         | 5          | 30                       |                           |                           |                          |                              |
| 4-Nitroaniline             | 63                       | 66                        | 26-124                         | 4          | 30                       |                           |                           |                          |                              |
| Nitrobenzene               | 89                       | 92                        | 37-139                         | 2          | 30                       |                           |                           |                          |                              |
| 2-Nitrophenol              | 93                       | 96                        | 25-151                         | 3          | 30                       |                           |                           |                          |                              |
| 4-Nitrophenol              | 80                       | 81                        | 15-149                         | 1          | 30                       |                           |                           |                          |                              |
| N-Nitroso-di-n-propylamine | 93                       | 95                        | 46-128                         | 3          | 30                       |                           |                           |                          |                              |
| N-Nitrosodiphenylamine     | 87                       | 91                        | 33-148                         | 4          | 30                       |                           |                           |                          |                              |
| Di-n-octylphthalate        | 92                       | 92                        | 43-149                         | 1          | 30                       |                           |                           |                          |                              |
| Pentachlorophenol          | 94                       | 94                        | 23-145                         | 0          | 30                       |                           |                           |                          |                              |
| Phenanthrene               | 89                       | 90                        | 34-147                         | 1          | 30                       |                           |                           |                          |                              |
| Phenol                     | 99                       | 104                       | 39-151                         | 5          | 30                       |                           |                           |                          |                              |
| Pyrene                     | 88                       | 91                        | 76-124                         | 3          | 30                       |                           |                           |                          |                              |
| 2,4,5-Trichlorophenol      | 93                       | 93                        | 25-143                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4,6-Trichlorophenol      | 91                       | 94                        | 41-142                         | 3          | 30                       |                           |                           |                          |                              |

Batch number: 11118SLE026

Sample number(s): 6267988-6267991 UNSPK: 6267988

|                      |      |       |        |      |    |
|----------------------|------|-------|--------|------|----|
| Anthracene           | 108  | 694*  | 40-147 | 133* | 30 |
| Benzo(a)anthracene   | 131  | 1575* | 32-150 | 149* | 30 |
| Benzo(a)pyrene       | 140* | 1628* | 57-129 | 148* | 30 |
| Benzo(b)fluoranthene | 159* | 2292* | 53-131 | 155* | 30 |
| Benzo(g,h,i)perylene | 118  | 839*  | 60-123 | 129* | 30 |
| Chrysene             | 122* | 1441* | 76-114 | 146* | 30 |
| Fluorene             | 98   | 310*  | 46-137 | 99*  | 30 |
| Naphthalene          | 139* | 428*  | 52-132 | 89*  | 30 |
| Phenanthrene         | 161* | 2138* | 34-147 | 154* | 30 |
| Pyrene               | 154* | 2829* | 76-124 | 157* | 30 |

\*- Outside of specification

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(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name               | MS<br>%REC                                                    | MSD<br>%REC | MS/MSD<br>Limits | RPD<br>RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|-----------------------------|---------------------------------------------------------------|-------------|------------------|------------|------------|-------------|-------------|------------|----------------|
| Batch number: 111171026001A | Sample number(s): 6267982-6267991 UNSPK: 6267982 BKG: 6267982 |             |                  |            |            |             |             |            |                |
| Lead                        | -1433<br>(2)                                                  | -224<br>(2) | 75-125           | 7          | 20         | 524         | 487         | 7          | 20             |
| Batch number: 111175708002  | Sample number(s): 6267992-6267996 UNSPK: 6267992 BKG: 6267992 |             |                  |            |            |             |             |            |                |
| Aluminum                    | 1848<br>(2)                                                   | 1822<br>(2) | 90-110           | 0          | 20         | 13,600      | 14,200      | 4          | 20             |
| Antimony                    | 69*                                                           | 68*         | 75-125           | 0          | 20         | < 1.96      | < 1.96      | 6 (1)      | 20             |
| Arsenic                     | 110                                                           | 88          | 75-125           | 5          | 20         | 53.2        | 57.4        | 8          | 20             |
| Barium                      | 101                                                           | 92          | 75-125           | 5          | 20         | 128         | 130         | 2          | 20             |
| Beryllium                   | 111                                                           | 109         | 83-111           | 0          | 20         | 0.743       | 0.828       | 11 (1)     | 20             |
| Cadmium                     | 99                                                            | 93          | 75-125           | 5          | 20         | < 0.490     | < 0.490     | 17 (1)     | 20             |
| Calcium                     | 978 (2)                                                       | 8224<br>(2) | 75-125           | 107*       | 20         | 8,620       | 8,790       | 2          | 20             |
| Chromium                    | 440*                                                          | 128*        | 75-125           | 64*        | 20         | 39.5        | 46.1        | 15         | 20             |
| Cobalt                      | 96                                                            | 91          | 78-113           | 4          | 20         | 7.09        | 7.64        | 7          | 20             |
| Copper                      | 128*                                                          | 102         | 75-125           | 7          | 20         | 53.6        | 72.4        | 30*        | 20             |
| Iron                        | 5057<br>(2)                                                   | 3370<br>(2) | 75-125           | 6          | 20         | 22,600      | 24,500      | 8          | 20             |
| Lead                        | 265 (2)                                                       | 107 (2)     | 75-125           | 12         | 20         | 166         | 187         | 11         | 20             |
| Magnesium                   | 959 (2)                                                       | 291 (2)     | 75-125           | 28*        | 20         | 3,440       | 3,680       | 7          | 20             |
| Manganese                   | 3118<br>(2)                                                   | 79 (2)      | 75-125           | 125*       | 20         | 403         | 417         | 3          | 20             |
| Nickel                      | 100                                                           | 93          | 75-125           | 5          | 20         | 22.0        | 24.2        | 10         | 20             |
| Potassium                   | 171*                                                          | 179*        | 75-125           | 3          | 20         | 1,410       | 1,480       | 4          | 20             |
| Selenium                    | 101                                                           | 100         | 75-125           | 0          | 20         | < 1.96      | < 1.96      | 0 (1)      | 20             |
| Silver                      | 114                                                           | 110         | 75-125           | 2          | 20         | < 0.490     | < 0.490     | 0 (1)      | 20             |
| Sodium                      | 108                                                           | 107         | 75-125           | 1          | 20         | 254         | 285         | 11 (1)     | 20             |
| Thallium                    | 95                                                            | 87          | 75-125           | 6          | 20         | < 2.94      | < 2.94      | 11 (1)     | 20             |
| Vanadium                    | 226*                                                          | 97          | 75-125           | 47*        | 20         | 54.6        | 56.6        | 4          | 20             |
| Zinc                        | 125                                                           | 96          | 75-125           | 6          | 20         | 164         | 165         | 1          | 20             |
| Batch number: 111175711001  | Sample number(s): 6267992-6267996 UNSPK: 6267992 BKG: 6267992 |             |                  |            |            |             |             |            |                |
| Mercury                     | 93                                                            | 96          | 80-120           | 4          | 20         | 0.158       | 0.177       | 12 (1)     | 20             |
| Batch number: 11118820008A  | Sample number(s): 6267982-6267996 BKG: 6267991                |             |                  |            |            |             |             |            |                |
| Moisture                    |                                                               |             |                  |            |            | 17.3        | 17.0        | 2          | 15             |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: A111182AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6267982 | 107                  | 96                    | 130*       | 80                   |
| 6267983 | 94                   | 101                   | 110        | 77                   |
| 6267984 | 99                   | 102                   | 100        | 86                   |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

### Surrogate Quality Control

|         |     |     |     |     |
|---------|-----|-----|-----|-----|
| 6267985 | 100 | 101 | 100 | 89  |
| 6267986 | 102 | 103 | 105 | 84  |
| 6267987 | 99  | 100 | 109 | 79  |
| 6267988 | 105 | 102 | 122 | 74  |
| 6267989 | 102 | 102 | 118 | 75  |
| Blank   | 99  | 100 | 99  | 94  |
| LCS     | 100 | 99  | 100 | 100 |
| LCSD    | 99  | 98  | 101 | 99  |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: Q111241AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6267996 | 73                   | 70                    | 72         | 89                   |
| Blank   | 98                   | 102                   | 98         | 98                   |
| LCS     | 96                   | 98                    | 97         | 96                   |
| LCSD    | 99                   | 101                   | 99         | 97                   |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: X111191AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6267990 | 98                   | 99                    | 99         | 83                   |
| 6267991 | 110                  | 111*                  | 129*       | 69*                  |
| 6267992 | 103                  | 104                   | 110        | 75                   |
| 6267995 | 98                   | 103                   | 105        | 79                   |
| Blank   | 102                  | 104                   | 91         | 92                   |
| LCS     | 101                  | 106                   | 101        | 98                   |
| MS      | 94                   | 70                    | 107        | 90                   |
| MSD     | 97                   | 98                    | 103        | 93                   |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: X111231AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6267993 | 101                  | 106                   | 91         | 94                   |
| 6267994 | 105                  | 107                   | 91         | 93                   |
| Blank   | 103                  | 103                   | 91         | 94                   |
| LCS     | 102                  | 106                   | 100        | 97                   |
| LCSD    | 101                  | 103                   | 99         | 96                   |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: PAH 8270 (microwave)  
Batch number: 11116SLD026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6267982 | 93              | 81               | 66            |
| 6267983 | 89              | 100              | 96            |
| 6267984 | 89              | 102              | 99            |
| 6267985 | 93              | 89               | 88            |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 06:45 PM

Group Number: 1243734

### Surrogate Quality Control

|         |     |     |    |
|---------|-----|-----|----|
| 6267986 | 89  | 85  | 89 |
| 6267987 | 91  | 95  | 98 |
| Blank   | 93  | 96  | 92 |
| LCS     | 96  | 97  | 89 |
| MS      | 101 | 101 | 88 |
| MSD     | 111 | 102 | 90 |

Limits: 55-121 56-121 43-124

Analysis Name: TCL 8270 (microwave)

Batch number: 11117SLJ026

| Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6267992   | 87             | 88                   | 74              | 85               | 87            |
| 6267993   | 91             | 93                   | 75              | 86               | 91            |
| 6267994   | 85             | 83                   | 63              | 82               | 83            |
| 6267995   | 82             | 84                   | 64              | 78               | 81            |
| 6267996   | 96             | 78                   | 61              | 99               | 87            |
| Blank     | 86             | 87                   | 85              | 80               | 82            |
| LCS       | 100            | 99                   | 90              | 89               | 91            |
| MS        | 98             | 95                   | 84              | 82               | 82            |
| MSD       | 101            | 100                  | 85              | 84               | 84            |

Limits: 42-130 39-136 28-139 55-121 56-121 43-124

Analysis Name: PAH 8270 (microwave)

Batch number: 11118SLE026

| Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|-----------------|------------------|---------------|
| 6267988         | 95               | 101           |
| 6267989         | 91               | 100           |
| 6267990         | 96               | 99            |
| 6267991         | 119              | 129*          |
| Blank           | 90               | 93            |
| LCS             | 91               | 101           |
| MS              | 100              | 111           |
| MSD             | 100              | 102           |

Limits: 55-121 56-121 43-124

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1243734 Sample # 6267982-96

COC # 259434

Please print. Instructions on reverse side correspond with circled numbers.

|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
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| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/#: <u>PHILA REF AOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOEER</u> P.O.#: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                                                                  |  |  |  | <b>Matrix</b><br>Check if Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Applicable <input type="checkbox"/><br>Soil <input type="checkbox"/> Water <input type="checkbox"/> Other <input type="checkbox"/> |  | <b>5 Analyses Requested</b><br><b>Preservation Codes</b><br><table border="1" style="width:100%; height: 100px;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <b>For Lab Use Only</b><br>FSC: _____<br>SCR#: _____ |  |                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
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| <b>6</b> Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other                                                                                                                                                                                                                          |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                                                                       |  |  |  | <b>3</b> Composite<br>Grab <input type="checkbox"/> Composite <input type="checkbox"/>                                                                                                                                       |  | <b>4</b> Total # of Containers<br>Soil <input type="checkbox"/> Water <input type="checkbox"/> Other <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | <b>5</b> Analyses Requested<br><b>Preservation Codes</b><br><table border="1" style="width:100%; height: 100px;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |
|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
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|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
| <b>Remarks</b><br><div style="font-size: 1.2em; margin-top: 20px;">           See attached list for analyses<br/>           Temp 1.8-2.4°C         </div>                                                                                                                                                                                            |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): Normal Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____                                            |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/22/11</u> Time <u>1330</u>                                                                                                                                                     |  | Received by: <u>Sample Fridge</u> Date <u>4/22/11</u> Time <u>1330</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No<br>Type IV (CLP SOW) (if yes, indicate QC sample and submit triplicate volume)<br>Type VI (Raw Data Only) Internal COC Required? Yes / No _____ |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/25/11</u> Time <u>1550</u>                                                                                                                                                     |  | Received by: <u>[Signature]</u> Date <u>4/25/11</u> Time <u>1020</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Received by: <u>[Signature]</u> Date <u>4/25/11</u> Time <u>1550</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                      |  |                                                             |  |

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1243734 Sample # 6267982-96

**COC # 253841**

Please print. Instructions on reverse side correspond with circled numbers.

|                                                                                                                                                                                                                                                                       |  |  |  |                                                                                                                                                                                                                              |  |                                                                                                                                                          |  |                                                                   |  |  |  |  |  |  |  |                                                              |  |                                                             |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------|--|--|--|--|--|--|--|--------------------------------------------------------------|--|-------------------------------------------------------------|--|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF NOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u> |  |  |  | <b>Matrix</b><br>Check if Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Applicable <input type="checkbox"/><br>Soil <input type="checkbox"/> Water <input type="checkbox"/> Other <input type="checkbox"/> |  | <b>5 Analyses Requested</b><br><b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |  |                                                                   |  |  |  |  |  |  |  | <b>For Lab Use Only</b><br>FSC: _____<br>SCR#: <u>100271</u> |  |                                                             |  |
|                                                                                                                                                                                                                                                                       |  |  |  |                                                                                                                                                                                                                              |  | <b>6</b> Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other                              |  |                                                                   |  |  |  |  |  |  |  |                                                              |  |                                                             |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                        |  |  |  | <b>3</b> Composite                                                                                                                                                                                                           |  | <b>4</b> Total # of Containers                                                                                                                           |  | <b>5</b> Analyses Requested<br>TCL 8260<br>TCL 8270<br>TCL metals |  |  |  |  |  |  |  |                                                              |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |
| Date Collected Time Collected Grab Composite                                                                                                                                                                                                                          |  |  |  | Soil Water Other                                                                                                                                                                                                             |  | Total # of Containers                                                                                                                                    |  | Remarks                                                           |  |  |  |  |  |  |  |                                                              |  | Temperature of samples upon receipt (if requested)          |  |
| BH-10-75-0-2' 4/19/11 1600 X                                                                                                                                                                                                                                          |  |  |  | X                                                                                                                                                                                                                            |  | 4                                                                                                                                                        |  | X X X                                                             |  |  |  |  |  |  |  |                                                              |  | Temp 1.8-2.4°C                                              |  |
| BH-10-82-0-2' 4/20/11 1515 X                                                                                                                                                                                                                                          |  |  |  | X                                                                                                                                                                                                                            |  | 4                                                                                                                                                        |  | X X X                                                             |  |  |  |  |  |  |  |                                                              |  | X                                                           |  |
| BH-10-81-0-2' 4/21/11 900 X                                                                                                                                                                                                                                           |  |  |  | X                                                                                                                                                                                                                            |  | 4                                                                                                                                                        |  | X X X                                                             |  |  |  |  |  |  |  |                                                              |  | X                                                           |  |
| BH-10-83-0-2' 4/21/11 940 X                                                                                                                                                                                                                                           |  |  |  | X                                                                                                                                                                                                                            |  | 4                                                                                                                                                        |  | X X X                                                             |  |  |  |  |  |  |  |                                                              |  | X                                                           |  |
| BH-10-57-0-2' 4/21/11 1145 X                                                                                                                                                                                                                                          |  |  |  | X                                                                                                                                                                                                                            |  | 4                                                                                                                                                        |  | X X X                                                             |  |  |  |  |  |  |  |                                                              |  | X                                                           |  |

|                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                      |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------|--|
| <b>7</b> Turnaround Time Requested (TAT) (please circle): Normal Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |  |  | Relinquished by: <u>Bottle Storage</u> Date Time Received by: <u>D. Lacey</u> 4/1/11 10015           |  |
|                                                                                                                                                                                                                                                                                                           |  |  |  | Relinquished by: <u>D. Lacey</u> 4/1/11 958 Date Time Received by: _____                             |  |
|                                                                                                                                                                                                                                                                                                           |  |  |  | Relinquished by: <u>SAK AGT</u> 4/21/11 1800 Date Time Received by: <u>Sample Frige</u> 4/21/11 1800 |  |
|                                                                                                                                                                                                                                                                                                           |  |  |  | Relinquished by: <u>SAK AGT</u> 4/25/11 1020 Date Time Received by: <u>D. Lacey</u> 4/25/11 1020     |  |
|                                                                                                                                                                                                                                                                                                           |  |  |  | Relinquished by: <u>D. Lacey</u> 4/25/11 1550 Date Time Received by: <u>BZ</u> 4/25/11 1550          |  |

|                                                           |                                                            |                      |    |
|-----------------------------------------------------------|------------------------------------------------------------|----------------------|----|
| <b>8</b> Data Package Options (please circle if required) |                                                            | SDG Complete? Yes No |    |
| Type I (validation/NJ Reg)                                | TX TRRP-13                                                 | Yes                  | No |
| Type II (Tier II)                                         | MA MCP CT RCP                                              |                      |    |
| Type III (Reduced NJ)                                     | Site-specific QC (MS/MSD/Dup)? Yes No                      |                      |    |
| Type IV (CLP SOW)                                         | (If yes, indicate QC sample and submit triplicate volume.) |                      |    |
| Type VI (Raw Data Only)                                   | Internal COC Required? Yes / No _____                      |                      |    |

# 626-7982-96

★ 501

**Table 1b**  
**Constituents of Concern for Soil**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| METALS       |  | CAS No.   |
|--------------|--|-----------|
| Lead (total) |  | 7439-92-1 |

| VOLATILE ORGANIC COMPOUNDS  |  | CAS No.   |
|-----------------------------|--|-----------|
| 1,2-Dichloroethane          |  | 107-06-2  |
| 1,2,4-Trimethylbenzene      |  | 95-63-6   |
| 1,3,5-Trimethylbenzene      |  | 108-67-8  |
| Benzene                     |  | 71-43-2   |
| Cumene                      |  | 98-82-8   |
| Ethylbenzene                |  | 100-41-4  |
| Ethylene dibromide          |  | 106-93-4  |
| Methyl tertiary butyl ether |  | 1634-04-4 |
| Toluene                     |  | 108-88-3  |
| Xylenes (total)             |  | 1330-20-7 |

| SEMI-VOLATILE ORGANIC COMPOUNDS |  | CAS No.  |
|---------------------------------|--|----------|
| Anthracene                      |  | 120-12-7 |
| Benzolanthracene                |  | 56-55-3  |
| Benzo (g,h,i) perylene          |  | 191-24-2 |
| Benzolapylene                   |  | 50-32-8  |
| Benzobifluoranthene             |  | 205-99-2 |
| Chrysene                        |  | 218-01-9 |
| Fluorene                        |  | 86-73-7  |
| Naphthalene                     |  | 91-20-3  |
| Phenanthrene                    |  | 85-01-8  |
| Pyrene                          |  | 129-00-0 |

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.
2. Select soil samples to be collected within the CAMU and delineation soil samples will be analyzed for full TCL, SVOCs, TCL SVOCs, and TAL metals.



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

| Organic Qualifiers |                                                                           | Inorganic Qualifiers |                                                         |
|--------------------|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------|
| <b>A</b>           | TIC is a possible aldol-condensation product                              | <b>B</b>             | Value is $<$ CRDL, but $\geq$ IDL                       |
| <b>B</b>           | Analyte was also detected in the blank                                    | <b>E</b>             | Estimated due to interference                           |
| <b>C</b>           | Pesticide result confirmed by GC/MS                                       | <b>M</b>             | Duplicate injection precision not met                   |
| <b>D</b>           | Compound quantitated on a diluted sample                                  | <b>N</b>             | Spike sample not within control limits                  |
| <b>E</b>           | Concentration exceeds the calibration range of the instrument             | <b>S</b>             | Method of standard additions (MSA) used for calculation |
| <b>N</b>           | Presumptive evidence of a compound (TICs only)                            | <b>U</b>             | Compound was not detected                               |
| <b>P</b>           | Concentration difference between primary and confirmation columns $>25\%$ | <b>W</b>             | Post digestion spike out of control limits              |
| <b>U</b>           | Compound was not detected                                                 | <b>*</b>             | Duplicate analysis not within control limits            |
| <b>X,Y,Z</b>       | Defined in case narrative                                                 | <b>+</b>             | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

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May 02, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/21/2011  
Group Number: 1243395  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionBH-10-42\_0-2' Grab Soil  
BH-10-49\_0-2' Grab Soil  
BH-10-47\_0-2' Grab Soil  
BH-10-50\_0-2' Grab Soil  
W-29\_0-2' Grab Soil  
W-28\_0-2' Grab Soil  
W-34\_0-2' Grab Soil  
BH-10-76\_0-2' Grab Soil  
W-33\_0-2' Grab SoilLancaster Labs (LLI) #6265762  
6265763  
6265764  
6265765  
6265766  
6265767  
6265768  
6265769  
6265770

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC Langan

COPY TO

Attn: Dennis Webster

ELECTRONIC SUN: Aquaterra Tech.

COPY TO

Attn: Tiffani Doerr

ELECTRONIC LLI

COPY TO

Attn: EDD Group

ELECTRONIC Langan

COPY TO

Attn: Kristen Ward

ELECTRONIC Aquaterra Tech

COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Robin C. Runkle  
Senior Specialist





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 2

**Sample Description:** BH-10-42\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-42\_0-2'

LLI Sample # SW 6265762  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH104

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 7          | 7                          | 0.7                        | 1.1             |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 7          | 7                          | 1                          | 1.1             |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 7          | 7                          | 1                          | 1.1             |
| 10950        | Ethylbenzene                | 100-41-4            | < 7          | 7                          | 1                          | 1.1             |
| 10950        | Isopropylbenzene            | 98-82-8             | < 7          | 7                          | 1                          | 1.1             |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 7          | 7                          | 0.7                        | 1.1             |
| 10950        | Toluene                     | 108-88-3            | < 7          | 7                          | 1                          | 1.1             |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 7          | 7                          | 1                          | 1.1             |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 7          | 7                          | 1                          | 1.1             |
| 10950        | Xylene (Total)              | 1330-20-7           | < 7          | 7                          | 1                          | 1.1             |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 1,200        | 980          | 200          | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 1,400        | 980          | 200          | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 1,300        | 980          | 200          | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 1,500        | 980          | 200          | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 2,200        | 980          | 200          | 1 |
| 10724        | Chrysene             | 218-01-9            | 2,600        | 980          | 200          | 1 |
| 10724        | Fluorene             | 86-73-7             | < 980        | 980          | 200          | 1 |
| 10724        | Naphthalene          | 91-20-3             | 2,800        | 980          | 200          | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 2,900        | 980          | 200          | 1 |
| 10724        | Pyrene               | 129-00-0            | 2,500        | 980          | 200          | 1 |

Reporting limits were raised due to interference from the sample matrix.

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |    |
|--------|------|-------------|-------|-------|--------|----|
| 06135  | Lead | 7439-92-1   | 249   | 1.16  | 0.0602 | 10 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 15.3 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-42\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-42\_0-2'

LLI Sample # SW 6265762  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH104

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111172AA     | 04/28/2011 02:57       | Kristen D Pelliccia | 1.1             |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213  | 04/19/2011 10:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111224213  | 04/19/2011 10:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111224213  | 04/19/2011 10:00       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 13:18       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:25       | David K Beck        | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher    | 1               |

**Sample Description:** BH-10-49\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-49\_0-2'

LLI Sample # SW 6265763  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/21/2011 16:00

Reported: 05/02/2011 18:03

BH109

| CAT No.                                                                                                                                                               | Analysis Name               | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>                                                                                                                                   |                             |            |            |                            |                            |                 |
| 10950                                                                                                                                                                 | Benzene                     | 71-43-2    | 7          | 7                          | 0.7                        | 0.93            |
| 10950                                                                                                                                                                 | 1,2-Dibromoethane           | 106-93-4   | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | 1,2-Dichloroethane          | 107-06-2   | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | Ethylbenzene                | 100-41-4   | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | Isopropylbenzene            | 98-82-8    | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | Methyl Tertiary Butyl Ether | 1634-04-4  | < 7        | 7                          | 0.7                        | 0.93            |
| 10950                                                                                                                                                                 | Toluene                     | 108-88-3   | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | 1,2,4-Trimethylbenzene      | 95-63-6    | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | 1,3,5-Trimethylbenzene      | 108-67-8   | < 7        | 7                          | 1                          | 0.93            |
| 10950                                                                                                                                                                 | Xylene (Total)              | 1330-20-7  | < 7        | 7                          | 1                          | 0.93            |
| <b>GC/MS Semivolatiles SW-846 8270C</b>                                                                                                                               |                             |            |            |                            |                            |                 |
| 10724                                                                                                                                                                 | Anthracene                  | 120-12-7   | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)anthracene          | 56-55-3    | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)pyrene              | 50-32-8    | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Benzo(b)fluoranthene        | 205-99-2   | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Benzo(g,h,i)perylene        | 191-24-2   | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Chrysene                    | 218-01-9   | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Fluorene                    | 86-73-7    | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Naphthalene                 | 91-20-3    | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Phenanthrene                | 85-01-8    | < 240      | 240                        | 47                         | 1               |
| 10724                                                                                                                                                                 | Pyrene                      | 129-00-0   | < 240      | 240                        | 47                         | 1               |
| <b>Metals SW-846 6020</b>                                                                                                                                             |                             |            |            |                            |                            |                 |
| 06135                                                                                                                                                                 | Lead                        | 7439-92-1  | 340        | 1.38                       | 0.0716                     | 10              |
| <b>Wet Chemistry SM20 2540 G</b>                                                                                                                                      |                             |            |            |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture                    | n.a.       | 29.5       | 0.50                       | 0.50                       | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                             |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111181AA    | 04/29/2011 00:16       | Kristen D Pelliccia | 0.93            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213 | 04/19/2011 10:30       | Client Supplied     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-49\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-49\_0-2'

LLI Sample # SW 6265763  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH109

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111224213  | 04/19/2011 10:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111224213  | 04/19/2011 10:30       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 16:51       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:36       | David K Beck      | 10              |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |

**Sample Description:** BH-10-47\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-47\_0-2'

LLI Sample # SW 6265764  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/21/2011 16:00

Reported: 05/02/2011 18:03

BH107

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.82            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.82            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.82            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.82            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 250          | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 670          | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 820          | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 830          | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 770          | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | 730          | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | 290          | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 540          | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | 810          | 200          | 40           | 1 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 233          | 1.18         | 0.0615       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 17.1     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-47\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-47\_0-2'

LLI Sample # SW 6265764  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH107

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111172AA     | 04/28/2011 01:25       | Kristen D Pelliccia | 0.82            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213  | 04/19/2011 11:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111224213  | 04/19/2011 11:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111224213  | 04/19/2011 11:00       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 17:17       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:38       | David K Beck        | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher    | 1               |



**Sample Description:** BH-10-50\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-50\_0-2'

**LLI Sample #** SW 6265765  
**LLI Group #** 1243395  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/19/2011 11:30 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/21/2011 16:00

PO Box 744

**Reported:** 05/02/2011 18:03

West Chester PA 19381

BH105

| CAT No.                                                                                                                                                               | Analysis Name               | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>                                                                                                                                   |                             |            |            |                            |                            |                 |
| 10950                                                                                                                                                                 | Benzene                     | 71-43-2    | < 5        | 5                          | 0.5                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2-Dibromoethane           | 106-93-4   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2-Dichloroethane          | 107-06-2   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Ethylbenzene                | 100-41-4   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Isopropylbenzene            | 98-82-8    | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Methyl Tertiary Butyl Ether | 1634-04-4  | < 5        | 5                          | 0.5                        | 0.8             |
| 10950                                                                                                                                                                 | Toluene                     | 108-88-3   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,2,4-Trimethylbenzene      | 95-63-6    | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | 1,3,5-Trimethylbenzene      | 108-67-8   | < 5        | 5                          | 0.9                        | 0.8             |
| 10950                                                                                                                                                                 | Xylene (Total)              | 1330-20-7  | < 5        | 5                          | 0.9                        | 0.8             |
| <b>GC/MS Semivolatiles SW-846 8270C</b>                                                                                                                               |                             |            |            |                            |                            |                 |
| 10724                                                                                                                                                                 | Anthracene                  | 120-12-7   | 1,400      | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)anthracene          | 56-55-3    | 1,900      | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Benzo(a)pyrene              | 50-32-8    | 1,300      | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Benzo(b)fluoranthene        | 205-99-2   | 1,500      | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Benzo(g,h,i)perylene        | 191-24-2   | 780        | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Chrysene                    | 218-01-9   | 1,700      | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Fluorene                    | 86-73-7    | 640        | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Naphthalene                 | 91-20-3    | 740        | 190                        | 37                         | 1               |
| 10724                                                                                                                                                                 | Phenanthrene                | 85-01-8    | 4,700      | 1,900                      | 370                        | 10              |
| 10724                                                                                                                                                                 | Pyrene                      | 129-00-0   | 3,300      | 190                        | 37                         | 1               |
| <b>Metals SW-846 6020</b>                                                                                                                                             |                             |            |            |                            |                            |                 |
| 06135                                                                                                                                                                 | Lead                        | 7439-92-1  | 84.7       | 0.556                      | 0.0289                     | 5               |
| <b>Wet Chemistry SM20 2540 G</b>                                                                                                                                      |                             |            |            |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture                    | n.a.       | 11.8       | 0.50                       | 0.50                       | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                             |            |            |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111181AA    | 04/29/2011 01:01       | Kristen D Pelliccia | 0.8             |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213 | 04/19/2011 11:30       | Client Supplied     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-50\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-50\_0-2'

LLI Sample # SW 6265765  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 11:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH105

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111224213  | 04/19/2011 11:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111224213  | 04/19/2011 11:30       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 17:44       | Matthew S Woods   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/29/2011 13:41       | Matthew S Woods   | 10              |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:44       | David K Beck      | 5               |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |



# Analysis Report

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Page 1 of 2

**Sample Description:** W-29\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-29\_0-2'

LLI Sample # SW 6265766  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/21/2011 16:00

Reported: 05/02/2011 18:03

W2902

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.95            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.95            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.95            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.95            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.95            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.95            |
| 10950        | Toluene                     | 108-88-3            | 6            | 5                          | 1                          | 0.95            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.95            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.95            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.95            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 830          | 190          | 38           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 900          | 190          | 38           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 840          | 190          | 38           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 970          | 190          | 38           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 760          | 190          | 38           | 1 |
| 10724        | Chrysene             | 218-01-9            | 1,100        | 190          | 38           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 190        | 190          | 38           | 1 |
| 10724        | Naphthalene          | 91-20-3             | 1,300        | 190          | 38           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,400        | 190          | 38           | 1 |
| 10724        | Pyrene               | 129-00-0            | 1,500        | 190          | 38           | 1 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 259          | 1.11         | 0.0575       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 13.9     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|--------|--------|------------------------|---------|-----------------|
|---------|---------------|--------|--------|--------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-29\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-29\_0-2'

LLI Sample # SW 6265766  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 11:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

W2902

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111172AA     | 04/28/2011 02:11       | Kristen D Pelliccia | 0.95            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213  | 04/19/2011 11:45       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111224213  | 04/19/2011 11:45       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111224213  | 04/19/2011 11:45       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 18:10       | Matthew S Woods     | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:45       | David K Beck        | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher    | 1               |



# Analysis Report

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**Sample Description:** W-28\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-28\_0-2'

LLI Sample # SW 6265767  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 14:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/21/2011 16:00

PO Box 744

Reported: 05/02/2011 18:03

West Chester PA 19381

W2802

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 300        | 300                        | 30                         | 50.09           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 300        | 300                        | 60                         | 50.09           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 300        | 300                        | 60                         | 50.09           |
| 10950        | Ethylbenzene                | 100-41-4            | < 300        | 300                        | 60                         | 50.09           |
| 10950        | Isopropylbenzene            | 98-82-8             | < 300        | 300                        | 60                         | 50.09           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 300        | 300                        | 30                         | 50.09           |
| 10950        | Toluene                     | 108-88-3            | < 300        | 300                        | 60                         | 50.09           |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 1,600        | 300                        | 60                         | 50.09           |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | 430          | 300                        | 60                         | 50.09           |
| 10950        | Xylene (Total)              | 1330-20-7           | 540          | 300                        | 60                         | 50.09           |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 570          | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 630          | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 390          | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 270          | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 220          | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | 1,400        | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | 970          | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | 670          | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 1,900        | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | 1,400        | 200          | 40           | 1 |

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|--------|------|-------------|-------|-------|--------|---|
| 06135  | Lead | 7439-92-1   | 181   | 0.574 | 0.0298 | 5 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 17.0 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | R111173AA    | 04/28/2011 07:35       | Stephanie A Selis | 50.09           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213 | 04/19/2011 14:00       | Client Supplied   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-28\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-28\_0-2'

LLI Sample # SW 6265767  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/19/2011 14:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

W2802

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111224213  | 04/19/2011 14:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111224213  | 04/19/2011 14:00       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 18:37       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:47       | David K Beck      | 5               |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |



**Sample Description:** W-34\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-34\_0-2'

LLI Sample # SW 6265768  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 08:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/21/2011 16:00

PO Box 744

Reported: 05/02/2011 18:03

West Chester PA 19381

W3402

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.89            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.89            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.89            |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 190        | 190          | 39           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 550          | 190          | 39           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 540          | 190          | 39           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 620          | 190          | 39           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 470          | 190          | 39           | 1 |
| 10724        | Chrysene             | 218-01-9            | 600          | 190          | 39           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 190        | 190          | 39           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 190        | 190          | 39           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 590          | 190          | 39           | 1 |
| 10724        | Pyrene               | 129-00-0            | 860          | 190          | 39           | 1 |

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg |    |
|--------|------|-------------|-------|-------|-------|----|
| 06135  | Lead | 7439-92-1   | 561   | 2.35  | 0.122 | 20 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 14.9 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111181AA    | 04/29/2011 01:47       | Kristen D Pelliccia | 0.89            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213 | 04/20/2011 08:30       | Client Supplied     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-34\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-34\_0-2'

LLI Sample # SW 6265768  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 08:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

W3402

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111224213  | 04/20/2011 08:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111224213  | 04/20/2011 08:30       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 19:03       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:49       | David K Beck      | 20              |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |



# Analysis Report

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**Sample Description:** BH-10-76\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-76\_0-2'

LLI Sample # SW 6265769  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

BH176

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.89            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.89            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.89            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.89            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 1                          | 0.89            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 260          | 200          | 40           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 1,400        | 200          | 40           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 1,800        | 200          | 40           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 1,500        | 200          | 40           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 2,000        | 200          | 40           | 1 |
| 10724        | Chrysene             | 218-01-9            | 1,600        | 200          | 40           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 200        | 200          | 40           | 1 |
| 10724        | Naphthalene          | 91-20-3             | 340          | 200          | 40           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 740          | 200          | 40           | 1 |
| 10724        | Pyrene               | 129-00-0            | 990          | 200          | 40           | 1 |

|               |                    |              |              |              |     |
|---------------|--------------------|--------------|--------------|--------------|-----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |     |
| 06135 Lead    | 7439-92-1          | 1,990        | 11.9         | 0.621        | 100 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 17.1     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result





# Analysis Report

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**Sample Description:** BH-10-76\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 BH-10-76\_0-2'

**LLI Sample #** SW 6265769  
**LLI Group #** 1243395  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/20/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/21/2011 16:00

West Chester PA 19381

**Reported:** 05/02/2011 18:03

BH176

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111172AA     | 04/28/2011 07:34       | Laura M Krieger   | 0.89            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213  | 04/20/2011 10:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111224213  | 04/20/2011 10:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111224213  | 04/20/2011 10:30       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 19:30       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:51       | David K Beck      | 100             |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Page 1 of 2

**Sample Description:** W-33\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-33\_0-2'

LLI Sample # SW 6265770  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/21/2011 16:00

Reported: 05/02/2011 18:03

W3301

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 11           | 5                          | 0.5                        | 0.87            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 1                          | 0.87            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 1                          | 0.87            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 1                          | 0.87            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 1                          | 0.87            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.87            |
| 10950        | Toluene                     | 108-88-3            | 11           | 5                          | 1                          | 0.87            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 1                          | 0.87            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 1                          | 0.87            |
| 10950        | Xylene (Total)              | 1330-20-7           | 6            | 5                          | 1                          | 0.87            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 190        | 190          | 39           | 1 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 190        | 190          | 39           | 1 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 200          | 190          | 39           | 1 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 190        | 190          | 39           | 1 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 360          | 190          | 39           | 1 |
| 10724        | Chrysene             | 218-01-9            | < 190        | 190          | 39           | 1 |
| 10724        | Fluorene             | 86-73-7             | < 190        | 190          | 39           | 1 |
| 10724        | Naphthalene          | 91-20-3             | < 190        | 190          | 39           | 1 |
| 10724        | Phenanthrene         | 85-01-8             | 240          | 190          | 39           | 1 |
| 10724        | Pyrene               | 129-00-0            | 260          | 190          | 39           | 1 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 297          | 1.15         | 0.0596       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 14.4     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-33\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259436 W-33\_0-2'

LLI Sample # SW 6265770  
LLI Group # 1243395  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/20/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/21/2011 16:00

West Chester PA 19381

Reported: 05/02/2011 18:03

W3301

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | A111172AA     | 04/28/2011 07:56       | Laura M Krieger   | 0.87            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111224213  | 04/20/2011 11:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111224213  | 04/20/2011 11:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111224213  | 04/20/2011 11:15       | Client Supplied   | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11116SLD026   | 04/28/2011 19:56       | Matthew S Woods   | 1               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11116SLD026   | 04/27/2011 09:00       | Kerrie A Freeburn | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111131026001A | 04/30/2011 13:53       | David K Beck      | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111131026001  | 04/23/2011 11:01       | James L Mertz     | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11117820006A  | 04/27/2011 17:11       | Scott W Freisher  | 1               |



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/02/11 at 06:03 PM

Group Number: 1243395

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                                       | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---------------------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: A111172AA Sample number(s): 6265769-6265770           |              |             |           |              |          |           |                 |     |         |
| Benzene                                                             | < 5          | 5.          | 0.5       | ug/kg        | 103      |           | 80-120          |     |         |
| 1,2-Dibromoethane                                                   | < 5          | 5.          | 1         | ug/kg        | 103      |           | 80-120          |     |         |
| 1,2-Dichloroethane                                                  | < 5          | 5.          | 1         | ug/kg        | 105      |           | 71-129          |     |         |
| Ethylbenzene                                                        | < 5          | 5.          | 1         | ug/kg        | 101      |           | 80-120          |     |         |
| Isopropylbenzene                                                    | < 5          | 5.          | 1         | ug/kg        | 101      |           | 76-120          |     |         |
| Methyl Tertiary Butyl Ether                                         | < 5          | 5.          | 0.5       | ug/kg        | 105      |           | 74-121          |     |         |
| Toluene                                                             | < 5          | 5.          | 1         | ug/kg        | 101      |           | 80-120          |     |         |
| 1,2,4-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 99       |           | 79-120          |     |         |
| 1,3,5-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 101      |           | 78-120          |     |         |
| Xylene (Total)                                                      | < 5          | 5.          | 1         | ug/kg        | 99       |           | 80-120          |     |         |
| Batch number: R111173AA Sample number(s): 6265767                   |              |             |           |              |          |           |                 |     |         |
| Benzene                                                             | < 250        | 250.        | 25        | ug/kg        | 103      | 101       | 80-120          | 2   | 30      |
| 1,2-Dibromoethane                                                   | < 250        | 250.        | 50        | ug/kg        | 101      | 100       | 80-120          | 1   | 30      |
| 1,2-Dichloroethane                                                  | < 250        | 250.        | 50        | ug/kg        | 99       | 96        | 71-129          | 3   | 30      |
| Ethylbenzene                                                        | < 250        | 250.        | 50        | ug/kg        | 97       | 96        | 80-120          | 0   | 30      |
| Isopropylbenzene                                                    | < 250        | 250.        | 50        | ug/kg        | 95       | 92        | 76-120          | 3   | 30      |
| Methyl Tertiary Butyl Ether                                         | < 250        | 250.        | 25        | ug/kg        | 100      | 99        | 74-121          | 0   | 30      |
| Toluene                                                             | < 250        | 250.        | 50        | ug/kg        | 102      | 100       | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                                              | < 250        | 250.        | 50        | ug/kg        | 93       | 93        | 79-120          | 0   | 30      |
| 1,3,5-Trimethylbenzene                                              | < 250        | 250.        | 50        | ug/kg        | 96       | 95        | 78-120          | 1   | 30      |
| Xylene (Total)                                                      | < 250        | 250.        | 50        | ug/kg        | 100      | 98        | 80-120          | 2   | 30      |
| Batch number: X111172AA Sample number(s): 6265762, 6265764, 6265766 |              |             |           |              |          |           |                 |     |         |
| Benzene                                                             | < 5          | 5.          | 0.5       | ug/kg        | 95       | 96        | 80-120          | 2   | 30      |
| 1,2-Dibromoethane                                                   | < 5          | 5.          | 1         | ug/kg        | 97       | 98        | 80-120          | 1   | 30      |
| 1,2-Dichloroethane                                                  | < 5          | 5.          | 1         | ug/kg        | 94       | 94        | 71-129          | 0   | 30      |
| Ethylbenzene                                                        | < 5          | 5.          | 1         | ug/kg        | 94       | 96        | 80-120          | 1   | 30      |
| Isopropylbenzene                                                    | < 5          | 5.          | 1         | ug/kg        | 96       | 97        | 76-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                         | < 5          | 5.          | 0.5       | ug/kg        | 87       | 89        | 74-121          | 2   | 30      |
| Toluene                                                             | < 5          | 5.          | 1         | ug/kg        | 95       | 96        | 80-120          | 1   | 30      |
| 1,2,4-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 91       | 93        | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 93       | 95        | 78-120          | 2   | 30      |
| Xylene (Total)                                                      | < 5          | 5.          | 1         | ug/kg        | 98       | 99        | 80-120          | 1   | 30      |
| Batch number: X111181AA Sample number(s): 6265763, 6265765, 6265768 |              |             |           |              |          |           |                 |     |         |
| Benzene                                                             | < 5          | 5.          | 0.5       | ug/kg        | 98       | 96        | 80-120          | 2   | 30      |
| 1,2-Dibromoethane                                                   | < 5          | 5.          | 1         | ug/kg        | 100      | 102       | 80-120          | 2   | 30      |
| 1,2-Dichloroethane                                                  | < 5          | 5.          | 1         | ug/kg        | 97       | 98        | 71-129          | 1   | 30      |
| Ethylbenzene                                                        | < 5          | 5.          | 1         | ug/kg        | 97       | 97        | 80-120          | 0   | 30      |
| Isopropylbenzene                                                    | < 5          | 5.          | 1         | ug/kg        | 100      | 99        | 76-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                         | < 5          | 5.          | 0.5       | ug/kg        | 87       | 90        | 74-121          | 3   | 30      |
| Toluene                                                             | < 5          | 5.          | 1         | ug/kg        | 97       | 95        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 94       | 94        | 79-120          | 0   | 30      |
| 1,3,5-Trimethylbenzene                                              | < 5          | 5.          | 1         | ug/kg        | 97       | 95        | 78-120          | 2   | 30      |
| Xylene (Total)                                                      | < 5          | 5.          | 1         | ug/kg        | 100      | 100       | 80-120          | 0   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/02/11 at 06:03 PM

Group Number: 1243395

| <u>Analysis Name</u>        | <u>Blank Result</u>               | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-----------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Batch number: 11116SLD026   | Sample number(s): 6265762-6265770 |                    |                  |                     |                 |                  |                        |            |                |
| Anthracene                  | < 170                             | 170.               | 33               | ug/kg               | 92              |                  | 83-111                 |            |                |
| Benzo(a)anthracene          | < 170                             | 170.               | 33               | ug/kg               | 94              |                  | 82-111                 |            |                |
| Benzo(a)pyrene              | < 170                             | 170.               | 33               | ug/kg               | 80              |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene        | < 170                             | 170.               | 33               | ug/kg               | 88              |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene        | < 170                             | 170.               | 33               | ug/kg               | 83              |                  | 63-130                 |            |                |
| Chrysene                    | < 170                             | 170.               | 33               | ug/kg               | 92              |                  | 81-111                 |            |                |
| Fluorene                    | < 170                             | 170.               | 33               | ug/kg               | 95              |                  | 81-117                 |            |                |
| Naphthalene                 | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 83-112                 |            |                |
| Phenanthrene                | < 170                             | 170.               | 33               | ug/kg               | 88              |                  | 83-109                 |            |                |
| Pyrene                      | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 80-121                 |            |                |
| Batch number: 111131026001A | Sample number(s): 6265762-6265770 |                    |                  |                     |                 |                  |                        |            |                |
| Lead                        | < 0.196                           | 0.196              | 0.0102           | mg/kg               | 95              |                  | 83-110                 |            |                |
| Batch number: 11117820006A  | Sample number(s): 6265762-6265770 |                    |                  |                     |                 |                  |                        |            |                |
| Moisture                    |                                   |                    |                  |                     | 100             |                  | 99-101                 |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS %REC</u>                                                | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|-----------------------------|---------------------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: A111172AA     | Sample number(s): 6265769-6265770 UNSPK: P264746              |                 |                      |            |                |                 |                 |                |                    |
| Benzene                     | 116                                                           | 97              | 55-143               | 23         | 30             |                 |                 |                |                    |
| 1,2-Dibromoethane           | 145*                                                          | 94              | 54-129               | 47*        | 30             |                 |                 |                |                    |
| 1,2-Dichloroethane          | 114                                                           | 90              | 68-131               | 28         | 30             |                 |                 |                |                    |
| Ethylbenzene                | 101                                                           | 89              | 44-141               | 17         | 30             |                 |                 |                |                    |
| Isopropylbenzene            | 77                                                            | 78              | 38-144               | 3          | 30             |                 |                 |                |                    |
| Methyl Tertiary Butyl Ether | 111                                                           | 92              | 55-129               | 23         | 30             |                 |                 |                |                    |
| Toluene                     | 138                                                           | 101             | 50-146               | 36*        | 30             |                 |                 |                |                    |
| 1,2,4-Trimethylbenzene      | 126                                                           | 98              | 37-149               | 30         | 30             |                 |                 |                |                    |
| 1,3,5-Trimethylbenzene      | 124                                                           | 103             | 38-150               | 24         | 30             |                 |                 |                |                    |
| Xylene (Total)              | 95                                                            | 86              | 44-136               | 15         | 30             |                 |                 |                |                    |
| Batch number: 11116SLD026   | Sample number(s): 6265762-6265770 UNSPK: 6265762              |                 |                      |            |                |                 |                 |                |                    |
| Anthracene                  | 108                                                           | 104             | 40-147               | 3          | 30             |                 |                 |                |                    |
| Benzo(a)anthracene          | 107                                                           | 95              | 32-150               | 8          | 30             |                 |                 |                |                    |
| Benzo(a)pyrene              | 98                                                            | 82              | 57-129               | 11         | 30             |                 |                 |                |                    |
| Benzo(b)fluoranthene        | 92                                                            | 88              | 53-131               | 3          | 30             |                 |                 |                |                    |
| Benzo(g,h,i)perylene        | 114                                                           | 86              | 60-123               | 13         | 30             |                 |                 |                |                    |
| Chrysene                    | 122*                                                          | 117*            | 76-114               | 3          | 30             |                 |                 |                |                    |
| Fluorene                    | 99                                                            | 94              | 46-137               | 5          | 30             |                 |                 |                |                    |
| Naphthalene                 | 175*                                                          | 174*            | 52-132               | 1          | 30             |                 |                 |                |                    |
| Phenanthrene                | 127                                                           | 132             | 34-147               | 1          | 30             |                 |                 |                |                    |
| Pyrene                      | 125*                                                          | 123             | 76-124               | 1          | 30             |                 |                 |                |                    |
| Batch number: 111131026001A | Sample number(s): 6265762-6265770 UNSPK: 6265762 BKG: 6265762 |                 |                      |            |                |                 |                 |                |                    |
| Lead                        | -160<br>(2)                                                   | -1430<br>(2)    | 75-125               | 19         | 20             | 211             | 191             | 10             | 20                 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/02/11 at 06:03 PM

Group Number: 1243395

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name              | MS<br>%REC                        | MSD<br>%REC | MS/MSD<br>Limits | RPD<br>RPD | BKG<br>MAX<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|----------------------------|-----------------------------------|-------------|------------------|------------|--------------------|-------------|------------|----------------|
| Batch number: 11117820006A | Sample number(s): 6265762-6265770 |             |                  |            | BKG: P265760       |             |            |                |
| Moisture                   |                                   |             |                  |            | 32.1               | 32.6        | 2          | 15             |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: A111172AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6265769 | 105                  | 106                   | 119        | 72                   |
| 6265770 | 101                  | 104                   | 109        | 79                   |
| Blank   | 101                  | 105                   | 99         | 96                   |
| LCS     | 101                  | 103                   | 101        | 101                  |
| MS      | 110                  | 112*                  | 126*       | 75                   |
| MSD     | 100                  | 105                   | 110        | 84                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: R111173AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6265767 | 82                   | 86                    | 78         | 78                   |
| Blank   | 100                  | 105                   | 97         | 91                   |
| LCS     | 98                   | 99                    | 97         | 93                   |
| LCSD    | 94                   | 98                    | 94         | 90                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: X111172AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6265762 | 112                  | 110*                  | 122        | 69*                  |
| 6265764 | 98                   | 100                   | 99         | 81                   |
| 6265766 | 98                   | 99                    | 101        | 87                   |
| Blank   | 102                  | 105                   | 92         | 97                   |
| LCS     | 101                  | 99                    | 101        | 98                   |
| LCSD    | 101                  | 98                    | 100        | 98                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: X111181AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6265763 | 102                  | 103                   | 99         | 85                   |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/02/11 at 06:03 PM

Group Number: 1243395

### Surrogate Quality Control

|         |     |     |     |    |
|---------|-----|-----|-----|----|
| 6265765 | 102 | 106 | 97  | 89 |
| 6265768 | 102 | 105 | 95  | 87 |
| Blank   | 104 | 105 | 91  | 92 |
| LCS     | 102 | 99  | 100 | 98 |
| LCSD    | 102 | 99  | 101 | 99 |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: PAH 8270 (microwave)

Batch number: 11116SLD026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6265762 | 107             | 101              | 89            |
| 6265763 | 97              | 104              | 86            |
| 6265764 | 92              | 91               | 83            |
| 6265765 | 96              | 102              | 89            |
| 6265766 | 89              | 88               | 82            |
| 6265767 | 106             | 98               | 104           |
| 6265768 | 84              | 88               | 78            |
| 6265769 | 97              | 102              | 91            |
| 6265770 | 93              | 100              | 93            |
| Blank   | 93              | 96               | 92            |
| LCS     | 96              | 97               | 89            |
| MS      | 101             | 101              | 88            |
| MSD     | 111             | 102              | 90            |

|         |        |        |        |
|---------|--------|--------|--------|
| Limits: | 55-121 | 56-121 | 43-124 |
|---------|--------|--------|--------|

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only  
 Acct. # 10132 Group# 1243395 Sample # 6265762-70

**COC #** 259436

Please print. Instructions on reverse side correspond with circled numbers. 2-5°

|                                                                                                                                                                                                                                                                        |  |                |                |                                                                                                                                                                            |           |                                                                                                                    |       |       |                       |          |  |  |  |  |  |                                                             |  |  |  |         |                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------|-------|-------|-----------------------|----------|--|--|--|--|--|-------------------------------------------------------------|--|--|--|---------|-----------------------------------------------|
| <b>1</b> Client: <u>SUN- AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF AOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u> |  |                |                | <b>4</b> Matrix<br>Check if Applicable<br><input type="checkbox"/> Potable <input type="checkbox"/> NPDES<br><input type="checkbox"/> Water <input type="checkbox"/> Other |           | <b>5</b> Analyses Requested<br>Preservation Codes                                                                  |       |       |                       |          |  |  |  |  |  | For Lab Use Only<br>FSC: _____<br>SCR#: _____               |  |  |  |         |                                               |
|                                                                                                                                                                                                                                                                        |  |                |                |                                                                                                                                                                            |           | Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |       |       |                       |          |  |  |  |  |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |  |  |         |                                               |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                         |  | Date Collected | Time Collected | <b>3</b> Grab                                                                                                                                                              | Composite | Soil                                                                                                               | Water | Other | Total # of Containers |          |  |  |  |  |  |                                                             |  |  |  | Remarks |                                               |
| <u>BH-10-42-0-2'</u>                                                                                                                                                                                                                                                   |  | <u>4/19/11</u> | <u>1000</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         | <u>See attached form for list of analyses</u> |
| <u>BH-10-49-0-2'</u>                                                                                                                                                                                                                                                   |  |                | <u>1030</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>BH-10-47-0-2'</u>                                                                                                                                                                                                                                                   |  |                | <u>1100</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>BH-10-50-0-2'</u>                                                                                                                                                                                                                                                   |  |                | <u>1130</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>W-29-0-2'</u>                                                                                                                                                                                                                                                       |  |                | <u>1145</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>W-28-0-2'</u>                                                                                                                                                                                                                                                       |  |                | <u>1400</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>W-34-0-2'</u>                                                                                                                                                                                                                                                       |  | <u>4/20/11</u> | <u>830</u>     | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>BH-10-76-0-2'</u>                                                                                                                                                                                                                                                   |  |                | <u>1030</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |
| <u>W-33-0-2'</u>                                                                                                                                                                                                                                                       |  |                | <u>1115</u>    | <u>X</u>                                                                                                                                                                   |           | <u>X</u>                                                                                                           |       |       | <u>4</u>              | <u>X</u> |  |  |  |  |  |                                                             |  |  |  |         |                                               |

|                                                                                                                                                                                                                                                                                                                                |  |  |  |                                                                          |  |                                                                       |  |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------|--|-----------------------------------------------------------------------|--|----------|
| <b>7</b> Turnaround Time Requested (TAT) (please circle): Normal <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax <u>E-mail</u><br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/20/11</u> Time <u>1800</u> |  | Received by: <u>Sample Frige</u> Date <u>4/20/11</u> Time <u>1800</u> |  | <b>9</b> |
|                                                                                                                                                                                                                                                                                                                                |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/20/11</u> Time <u>0847</u> |  | Received by: <u>[Signature]</u> Date <u>4/21/11</u> Time <u>0947</u>  |  |          |
|                                                                                                                                                                                                                                                                                                                                |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/21/11</u> Time <u>1650</u> |  | Received by: _____ Date _____ Time _____                              |  |          |
|                                                                                                                                                                                                                                                                                                                                |  |  |  | Relinquished by: _____ Date _____ Time _____                             |  | Received by: <u>[Signature]</u> Date <u>4-21-11</u> Time <u>1600</u>  |  |          |

|                                                           |                                                            |                                    |  |
|-----------------------------------------------------------|------------------------------------------------------------|------------------------------------|--|
| <b>8</b> Data Package Options (please circle if required) |                                                            | SDG Complete? <u>Yes</u> <u>No</u> |  |
| Type I (validation/NJ Reg)                                | TX TRRP-13                                                 |                                    |  |
| Type II (Tier II)                                         | MA MCP CT RCP                                              |                                    |  |
| Type III (Reduced NJ)                                     | Site-specific QC (MS/MSD/Dup)? Yes <u>No</u>               |                                    |  |
| Type IV (CLP SOW)                                         | (If yes, indicate QC sample and submit triplicate volume.) |                                    |  |
| Type VI (Raw Data Only)                                   | Internal COC Required? Yes <u>No</u>                       |                                    |  |



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

| Organic Qualifiers |                                                                           | Inorganic Qualifiers |                                                         |
|--------------------|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------|
| <b>A</b>           | TIC is a possible aldol-condensation product                              | <b>B</b>             | Value is $<$ CRDL, but $\geq$ IDL                       |
| <b>B</b>           | Analyte was also detected in the blank                                    | <b>E</b>             | Estimated due to interference                           |
| <b>C</b>           | Pesticide result confirmed by GC/MS                                       | <b>M</b>             | Duplicate injection precision not met                   |
| <b>D</b>           | Compound quantitated on a diluted sample                                  | <b>N</b>             | Spike sample not within control limits                  |
| <b>E</b>           | Concentration exceeds the calibration range of the instrument             | <b>S</b>             | Method of standard additions (MSA) used for calculation |
| <b>N</b>           | Presumptive evidence of a compound (TICs only)                            | <b>U</b>             | Compound was not detected                               |
| <b>P</b>           | Concentration difference between primary and confirmation columns $>25\%$ | <b>W</b>             | Post digestion spike out of control limits              |
| <b>U</b>           | Compound was not detected                                                 | <b>*</b>             | Duplicate analysis not within control limits            |
| <b>X,Y,Z</b>       | Defined in case narrative                                                 | <b>+</b>             | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 27, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/19/2011  
Group Number: 1242849  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionW-31@0'-2' Grab Soil  
W-30@0'-2' Grab SoilLancaster Labs (LLI) #6262297  
6262298

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC      Langan

COPY TO

Attn: Dennis Webster

ELECTRONIC      SUN: Aquaterra Tech.

COPY TO

Attn: Tiffani Doerr

ELECTRONIC      LLI

COPY TO

Attn: EDD Group

ELECTRONIC      Langan

COPY TO

Attn: Kristen Ward

ELECTRONIC      Aquaterra Tech

COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



**Robin C. Runkle**  
**Senior Specialist**



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 2

**Sample Description:** W-31@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259437 W-31@0'-2'

**LLI Sample #** SW 6262297  
**LLI Group #** 1242849  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/15/2011 08:30 by TD

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 04/27/2011 17:23

31-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Benzene                     | 71-43-2             | 89 J         | 37                          | 370                       | 63.87           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 75                          | 370                       | 63.87           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 75                          | 370                       | 63.87           |
| 10950        | Ethylbenzene                | 100-41-4            | 76 J         | 75                          | 370                       | 63.87           |
| 10950        | Isopropylbenzene            | 98-82-8             | 400          | 75                          | 370                       | 63.87           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 37                          | 370                       | 63.87           |
| 10950        | Toluene                     | 108-88-3            | 94 J         | 75                          | 370                       | 63.87           |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 92 J         | 75                          | 370                       | 63.87           |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | 86 J         | 75                          | 370                       | 63.87           |
| 10950        | Xylene (Total)              | 1330-20-7           | 140 J        | 75                          | 370                       | 63.87           |

Reporting limits were raised due to interference from the sample matrix.

|              |                      |                     |              |              |              |    |
|--------------|----------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10724        | Anthracene           | 120-12-7            | 490 J        | 390          | 1,900        | 10 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 780 J        | 390          | 1,900        | 10 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 590 J        | 390          | 1,900        | 10 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 540 J        | 390          | 1,900        | 10 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | N.D.         | 390          | 1,900        | 10 |
| 10724        | Chrysene             | 218-01-9            | 2,600        | 390          | 1,900        | 10 |
| 10724        | Fluorene             | 86-73-7             | N.D.         | 390          | 1,900        | 10 |
| 10724        | Naphthalene          | 91-20-3             | N.D.         | 390          | 1,900        | 10 |
| 10724        | Phenanthrene         | 85-01-8             | 510 J        | 390          | 1,900        | 10 |
| 10724        | Pyrene               | 129-00-0            | 2,200        | 390          | 1,900        | 10 |

Reporting limits were raised due to interference from the sample matrix.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 955          | 0.152        | 2.93         | 25 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 14.6     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | R111161AA | 04/26/2011 07:39       | Stephanie A Selis | 63.87           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-31@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259437 W-31@0'-2'

LLI Sample # SW 6262297  
LLI Group # 1242849  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/15/2011 08:30 by TD

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 04/27/2011 17:23

31-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168  | 04/15/2011 08:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168  | 04/15/2011 08:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168  | 04/15/2011 08:30       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11110SLF026   | 04/21/2011 19:19       | Linda M Hartenstine | 10              |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11110SLF026   | 04/21/2011 09:30       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111111026002A | 04/25/2011 07:47       | Choon Y Tian        | 25              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111111026002  | 04/21/2011 13:00       | James L Mertz       | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11112820001B  | 04/22/2011 18:08       | Scott W Freisher    | 1               |



**Sample Description:** W-30@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259437 W-30@0'-2'

LLI Sample # SW 6262298  
LLI Group # 1242849  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/15/2011 11:30 by TD

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 04/27/2011 17:23

West Chester PA 19381

30-02

| CAT No.                                                                                                                                                               | Analysis Name               | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS Volatiles SW-846 8260B</b>                                                                                                                                   |                             |            |            |                             |                           |                 |
| 10950                                                                                                                                                                 | Benzene                     | 71-43-2    | 12 J       | 1                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | 1,2-Dibromoethane           | 106-93-4   | N.D.       | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | 1,2-Dichloroethane          | 107-06-2   | N.D.       | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | Ethylbenzene                | 100-41-4   | N.D.       | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | Isopropylbenzene            | 98-82-8    | N.D.       | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | Methyl Tertiary Butyl Ether | 1634-04-4  | N.D.       | 1                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | Toluene                     | 108-88-3   | 4 J        | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | 1,2,4-Trimethylbenzene      | 95-63-6    | 4 J        | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | 1,3,5-Trimethylbenzene      | 108-67-8   | 3 J        | 3                           | 13                        | 1.45            |
| 10950                                                                                                                                                                 | Xylene (Total)              | 1330-20-7  | N.D.       | 3                           | 13                        | 1.45            |
| <b>GC/MS Semivolatiles SW-846 8270C</b>                                                                                                                               |                             |            |            |                             |                           |                 |
| 10724                                                                                                                                                                 | Anthracene                  | 120-12-7   | N.D.       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Benzo(a)anthracene          | 56-55-3    | 70 J       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Benzo(a)pyrene              | 50-32-8    | N.D.       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Benzo(b)fluoranthene        | 205-99-2   | N.D.       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Benzo(g,h,i)perylene        | 191-24-2   | N.D.       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Chrysene                    | 218-01-9   | 400        | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Fluorene                    | 86-73-7    | N.D.       | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Naphthalene                 | 91-20-3    | 110 J      | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Phenanthrene                | 85-01-8    | 350        | 57                          | 290                       | 1               |
| 10724                                                                                                                                                                 | Pyrene                      | 129-00-0   | 280 J      | 57                          | 290                       | 1               |
| <b>Metals SW-846 6020</b>                                                                                                                                             |                             |            |            |                             |                           |                 |
| 06135                                                                                                                                                                 | Lead                        | 7439-92-1  | 1,990      | 0.431                       | 8.29                      | 50              |
| <b>Wet Chemistry SM20 2540 G</b>                                                                                                                                      |                             |            |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture                    | n.a.       | 42.0       | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                             |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111161AA    | 04/26/2011 09:25       | Holly Berry     | 1.45            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/15/2011 11:30       | Client Supplied | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 2 of 2

**Sample Description:** W-30@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259437 W-30@0'-2'

LLI Sample # SW 6262298  
LLI Group # 1242849  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/15/2011 11:30 by TD

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 04/27/2011 17:23

30-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|-------------------------------|--------------|--------|---------------|------------------------|---------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201111024168  | 04/15/2011 11:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201111024168  | 04/15/2011 11:30       | Client Supplied     | 1               |
| 10724   | PAH 8270 (microwave)          | SW-846 8270C | 1      | 11110SLF026   | 04/22/2011 00:07       | Linda M Hartenstine | 1               |
| 10814   | BNA Soil Microwave PAH        | SW-846 3546  | 1      | 11110SLF026   | 04/21/2011 09:30       | Kerrie A Freeburn   | 1               |
| 06135   | Lead                          | SW-846 6020  | 1      | 111111026002A | 04/25/2011 08:06       | Choon Y Tian        | 50              |
| 11026   | SW SW846 ICP-MS Digest        | SW-846 3050B | 1      | 111111026002  | 04/21/2011 13:00       | James L Mertz       | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 11112820001B  | 04/22/2011 18:08       | Scott W Freisher    | 1               |

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/27/11 at 05:23 PM

Group Number: 1242849

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                     | Blank Result | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: R111161AA           |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262297         |              |             |           |              |          |           |                 |     |         |
| Benzene                           | N.D.         | 25.         | 250       | ug/kg        | 101      | 105       | 80-120          | 5   | 30      |
| 1,2-Dibromoethane                 | N.D.         | 50.         | 250       | ug/kg        | 100      | 105       | 80-120          | 5   | 30      |
| 1,2-Dichloroethane                | N.D.         | 50.         | 250       | ug/kg        | 99       | 103       | 71-129          | 3   | 30      |
| Ethylbenzene                      | N.D.         | 50.         | 250       | ug/kg        | 91       | 95        | 80-120          | 4   | 30      |
| Isopropylbenzene                  | N.D.         | 50.         | 250       | ug/kg        | 89       | 92        | 76-120          | 4   | 30      |
| Methyl Tertiary Butyl Ether       | N.D.         | 25.         | 250       | ug/kg        | 101      | 105       | 74-121          | 4   | 30      |
| Toluene                           | N.D.         | 50.         | 250       | ug/kg        | 95       | 98        | 80-120          | 4   | 30      |
| 1,2,4-Trimethylbenzene            | N.D.         | 50.         | 250       | ug/kg        | 88       | 91        | 79-120          | 3   | 30      |
| 1,3,5-Trimethylbenzene            | N.D.         | 50.         | 250       | ug/kg        | 88       | 92        | 78-120          | 4   | 30      |
| Xylene (Total)                    | N.D.         | 50.         | 250       | ug/kg        | 94       | 98        | 80-120          | 4   | 30      |
| Batch number: X111161AA           |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262298         |              |             |           |              |          |           |                 |     |         |
| Benzene                           | N.D.         | 0.5         | 5         | ug/kg        | 100      | 100       | 80-120          | 0   | 30      |
| 1,2-Dibromoethane                 | N.D.         | 1.          | 5         | ug/kg        | 99       | 94        | 80-120          | 5   | 30      |
| 1,2-Dichloroethane                | N.D.         | 1.          | 5         | ug/kg        | 99       | 97        | 71-129          | 3   | 30      |
| Ethylbenzene                      | N.D.         | 1.          | 5         | ug/kg        | 99       | 100       | 80-120          | 2   | 30      |
| Isopropylbenzene                  | N.D.         | 1.          | 5         | ug/kg        | 101      | 103       | 76-120          | 2   | 30      |
| Methyl Tertiary Butyl Ether       | N.D.         | 0.5         | 5         | ug/kg        | 92       | 86        | 74-121          | 6   | 30      |
| Toluene                           | N.D.         | 1.          | 5         | ug/kg        | 99       | 99        | 80-120          | 0   | 30      |
| 1,2,4-Trimethylbenzene            | N.D.         | 1.          | 5         | ug/kg        | 95       | 97        | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene            | N.D.         | 1.          | 5         | ug/kg        | 98       | 100       | 78-120          | 2   | 30      |
| Xylene (Total)                    | N.D.         | 1.          | 5         | ug/kg        | 101      | 102       | 80-120          | 1   | 30      |
| Batch number: 11110SLF026         |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262297-6262298 |              |             |           |              |          |           |                 |     |         |
| Anthracene                        | N.D.         | 33.         | 170       | ug/kg        | 94       |           | 83-111          |     |         |
| Benzo(a)anthracene                | N.D.         | 33.         | 170       | ug/kg        | 93       |           | 82-111          |     |         |
| Benzo(a)pyrene                    | N.D.         | 33.         | 170       | ug/kg        | 77       |           | 63-138          |     |         |
| Benzo(b)fluoranthene              | N.D.         | 33.         | 170       | ug/kg        | 81       |           | 61-133          |     |         |
| Benzo(g,h,i)perylene              | N.D.         | 33.         | 170       | ug/kg        | 87       |           | 63-130          |     |         |
| Chrysene                          | N.D.         | 33.         | 170       | ug/kg        | 97       |           | 81-111          |     |         |
| Fluorene                          | N.D.         | 33.         | 170       | ug/kg        | 99       |           | 81-117          |     |         |
| Naphthalene                       | N.D.         | 33.         | 170       | ug/kg        | 92       |           | 83-112          |     |         |
| Phenanthrene                      | N.D.         | 33.         | 170       | ug/kg        | 93       |           | 83-109          |     |         |
| Pyrene                            | N.D.         | 33.         | 170       | ug/kg        | 101      |           | 80-121          |     |         |
| Batch number: 111111026002A       |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262297-6262298 |              |             |           |              |          |           |                 |     |         |
| Lead                              | N.D.         | 0.0102      | 0.196     | mg/kg        | 98       |           | 83-110          |     |         |
| Batch number: 11112820001B        |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262297-6262298 |              |             |           |              |          |           |                 |     |         |
| Moisture                          |              |             |           |              | 100      |           | 99-101          |     |         |

## Sample Matrix Quality Control

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.

Group Number: 1242849

Reported: 04/27/11 at 05:23 PM

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name               | MS<br>%REC                                                    | MSD<br>%REC  | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|-----------------------------|---------------------------------------------------------------|--------------|------------------|-----|------------|-------------|-------------|------------|----------------|
| Batch number: 11110SLF026   | Sample number(s): 6262297-6262298 UNSPK: 6262297              |              |                  |     |            |             |             |            |                |
| Anthracene                  | 70                                                            | 36*          | 40-147           | 44* | 30         |             |             |            |                |
| Benzo(a)anthracene          | 80                                                            | 36           | 32-150           | 45* | 30         |             |             |            |                |
| Benzo(a)pyrene              | 47*                                                           | 35*          | 57-129           | 17  | 30         |             |             |            |                |
| Benzo(b)fluoranthene        | 73                                                            | 35*          | 53-131           | 47* | 30         |             |             |            |                |
| Benzo(g,h,i)perylene        | 80                                                            | 58*          | 60-123           | 33* | 30         |             |             |            |                |
| Chrysene                    | 106                                                           | 29*          | 76-114           | 39* | 30         |             |             |            |                |
| Fluorene                    | 86                                                            | 61           | 46-137           | 35* | 30         |             |             |            |                |
| Naphthalene                 | 95                                                            | 73           | 52-132           | 27  | 30         |             |             |            |                |
| Phenanthrene                | 70                                                            | 45           | 34-147           | 30  | 30         |             |             |            |                |
| Pyrene                      | 58*                                                           | 22*          | 76-124           | 23  | 30         |             |             |            |                |
| Batch number: 111111026002A | Sample number(s): 6262297-6262298 UNSPK: 6262297 BKG: 6262297 |              |                  |     |            |             |             |            |                |
| Lead                        | -5739<br>(2)                                                  | -6952<br>(2) | 75-125           | 5   | 20         | 816         | 601         | 30*        | 20             |
| Batch number: 11112820001B  | Sample number(s): 6262297-6262298 BKG: P262286                |              |                  |     |            |             |             |            |                |
| Moisture                    |                                                               |              |                  |     |            | 41.8        | 42.2        | 1          | 15             |

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: R111161AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6262297 | 87                   | 91                    | 86         | 85                   |
| Blank   | 86                   | 91                    | 80         | 78                   |
| LCS     | 96                   | 102                   | 90         | 89                   |
| LCSD    | 99                   | 104                   | 92         | 90                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111161AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6262298 | 105                  | 105                   | 103        | 87                   |
| Blank   | 104                  | 100                   | 91         | 92                   |
| LCS     | 103                  | 106                   | 100        | 98                   |
| LCSD    | 101                  | 103                   | 102        | 98                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: PAH 8270 (microwave)

Batch number: 11110SLF026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6262297 | 99              | 84               | 78            |

\*- Outside of specification

\*\*-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/27/11 at 05:23 PM

Group Number: 1242849

### Surrogate Quality Control

|         |        |        |        |
|---------|--------|--------|--------|
| 6262298 | 87     | 98     | 81     |
| Blank   | 97     | 97     | 102    |
| LCS     | 91     | 100    | 99     |
| MS      | 99     | 87     | 79     |
| MSD     | 76     | 52*    | 48     |
| Limits: | 55-121 | 56-121 | 43-124 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.



**Lancaster  
Laboratories**

Acct. # 10132 Group# 1242849 Sample # 6262297-98 **COC #** 259437

0.8-2.1°

Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-6766  
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

Issued by Dept. 6042 Management  
2102.05

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

May 05, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/19/2011  
Group Number: 1242848  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionLancaster Labs (LLI) #

|                                |         |
|--------------------------------|---------|
| BH-10-69-WC_0-2' Grab Soil     | 6262260 |
| BH-10-69-WC_5-8' Grab Soil     | 6262261 |
| BH-10-69-WC_15.5-16' Grab Soil | 6262262 |
| BH-10-46-WC_0-2' Grab Soil     | 6262263 |
| BH-10-46-WC_5-8' Grab Soil     | 6262264 |
| BH-10-46-WC_17-18' Grab Soil   | 6262265 |
| BH-10-44-WC_0-2' Grab Soil     | 6262266 |
| BH-10-44-WC_10-12' Grab Soil   | 6262267 |
| BH-10-44-WC_24-26' Grab Soil   | 6262268 |
| BH-10-45-WC_0-2' Grab Soil     | 6262269 |
| BH-10-45-WC_5-8' Grab Soil     | 6262270 |
| BH-10-45-WC_18-20' Grab Soil   | 6262271 |
| BH-10-55-WC_0-2' Grab Soil     | 6262272 |
| BH-10-55-WC_5-8' Grab Soil     | 6262273 |
| BH-10-55-WC_20-22' Grab Soil   | 6262274 |
| BH-10-56-WC_0-2' Grab Soil     | 6262275 |
| BH-10-56-WC_10-12' Grab Soil   | 6262276 |
| BH-10-56-WC_22-24' Grab Soil   | 6262277 |
| BH-10-77-WC_0-2' Grab Soil     | 6262278 |
| BH-10-77-WC_10-12' Grab Soil   | 6262279 |
| BH-10-77-WC_20-22' Grab Soil   | 6262280 |
| BH-10-63-WC_0-2' Grab Soil     | 6262281 |
| BH-10-63-WC_12-14' Grab Soil   | 6262282 |
| BH-10-63-WC_21-23' Grab Soil   | 6262283 |
| BH-10-64-WC_0-2' Grab Soil     | 6262284 |
| BH-10-64-WC_11-13' Grab Soil   | 6262285 |
| BH-10-64-WC_24-26' Grab Soil   | 6262286 |
| BH-10-77-WC_6.5-7' Grab Soil   | 6262287 |
| BH-10-43_0-2' Grab Soil        | 6262288 |



|                           |         |
|---------------------------|---------|
| BH-10-48_0-2' Grab Soil   | 6262289 |
| BH-10-51_0-2' Grab Soil   | 6262290 |
| BH-10-52_0-2' Grab Soil   | 6262291 |
| BH-10-68_0-2' Grab Soil   | 6262292 |
| BH-10-65_0-2' Grab Soil   | 6262293 |
| BH-10-58_0-2' Grab Soil   | 6262294 |
| BH-10-65_6-8' Grab Soil   | 6262295 |
| BH-10-65_14-16' Grab Soil | 6262296 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

|                    |                      |                         |
|--------------------|----------------------|-------------------------|
| ELECTRONIC COPY TO | Langan               | Attn: Dennis Webster    |
| ELECTRONIC COPY TO | SUN: Aquaterra Tech. | Attn: Tiffani Doerr     |
| ELECTRONIC COPY TO | LLI                  | Attn: EDD Group         |
| ELECTRONIC COPY TO | Langan               | Attn: Kristen Ward      |
| ELECTRONIC COPY TO | Aquaterra Tech       | Attn: Loretta Belfiglio |

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



**Robin C. Runkle**  
Senior Specialist

**Sample Description:** BH-10-69-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_0-2'

LLI Sample # SW 6262260  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

69-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 81           | 8                           | 24                        | 1.02            |
| 10950        | Benzene                     | 71-43-2             | 4 J          | 0.6                         | 6                         | 1.02            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 5                           | 12                        | 1.02            |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Ethylbenzene                | 100-41-4            | 3 J          | 1                           | 6                         | 1.02            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 12                        | 1.02            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 12                        | 1.02            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                         | 6                         | 1.02            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 12                        | 1.02            |
| 10950        | Methylcyclohexane           | 108-87-2            | 3 J          | 1                           | 6                         | 1.02            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Toluene                     | 108-88-3            | 17           | 1                           | 6                         | 1.02            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Xylene (Total)              | 1330-20-7           | 16           | 1                           | 6                         | 1.02            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_0-2'

LLI Sample # SW 6262260  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

69-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 39                          | 200                       | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 79                          | 200                       | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 39                          | 200                       | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 39                          | 200                       | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 39                          | 200                       | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 79                          | 200                       | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 39                          | 200                       | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 39                          | 200                       | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 39                          | 200                       | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 39                          | 200                       | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 39                          | 200                       | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 39                          | 200                       | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 120                         | 390                       | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 79                          | 200                       | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 200                         | 590                       | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 390                         | 1,200                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 79                          | 200                       | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 39                          | 200                       | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 79                          | 390                       | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 200                         | 590                       | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 39                          | 200                       | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 39                          | 200                       | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 39                          | 200                       | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 85 J         | 39                          | 200                       | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 79                          | 200                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_0-2'

**LLI Sample #** SW 6262260  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

69-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 55 J         | 39                          | 200                       | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 39                          | 200                       | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 79                          | 200                       | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 79                          | 200                       | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 39                          | 200                       | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 39                          | 200                       | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 200                         | 590                       | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 39                          | 200                       | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 39                          | 200                       | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 79                          | 200                       | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 200                         | 590                       | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 39                          | 200                       | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 39                          | 200                       | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 39                          | 200                       | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 79                          | 200                       | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 39                          | 200                       | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 17,000       | 5.70                        | 22.7                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.13                        | 2.27                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 7.90         | 1.08                        | 2.27                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 80.8         | 0.0453                      | 0.566                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.60         | 0.0770                      | 0.566                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.159                       | 0.566                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 37,200       | 6.94                        | 22.7                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 20.9         | 0.668                       | 1.70                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 10.9         | 0.215                       | 0.566                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 25.3         | 0.249                       | 1.13                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 29,300       | 5.33                        | 22.7                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 21.2         | 0.680                       | 1.70                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 23,700       | 2.88                        | 11.3                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 804          | 0.0883                      | 0.566                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 17.7         | 0.215                       | 1.13                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,200        | 20.4                        | 56.6                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | 1.94 J       | 1.11                        | 2.27                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.204                       | 0.566                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 70.7 J       | 42.2                        | 113                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.64                        | 3.40                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 33.1         | 0.215                       | 0.566                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 72.0         | 0.747                       | 2.27                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 00159         | Mercury                                                                                                                                                                                                     | 7439-97-6           | 0.0447 J     | 0.0032                      | 0.111                     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-69-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_0-2'

LLI Sample # SW 6262260  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

69-02

| CAT No.                          | Analysis Name                                                                                                                                                         | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Wet Chemistry SM20 2540 G</b> |                                                                                                                                                                       |            |            |                             |                           |                 |
| 00111                            | Moisture                                                                                                                                                              | n.a.       | 15.1       | 0.50                        | 0.50                      | 1               |
|                                  | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 03:16       | Stephanie A Selis | 1.02            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 08:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 08:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 08:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 111110SLA026 | 04/21/2011 13:34       | Brian K Graham    | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 111110SLA026 | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 00:51       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 00:51       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 22:26       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06971   | Vanadium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 06972   | Zinc                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 10:12       | Damary Valentin   | 1               |
| 00159   | Mercury                        | SW-846 7471A | 1      | 111115711001 | 04/22/2011 06:33       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-69-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_0-2'

**LLI Sample #** SW 6262260  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 08:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

69-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_5-8'

**LLI Sample #** SW 6262261  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

69-58

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 4,700                       | 14,000                    | 547.02          |
| 10950        | Benzene                     | 71-43-2             | 900          | J 340                       | 3,400                     | 547.02          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 2,700                       | 6,800                     | 547.02          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Cyclohexane                 | 110-82-7            | 1,700        | J 680                       | 3,400                     | 547.02          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Ethylbenzene                | 100-41-4            | 1,300        | J 680                       | 3,400                     | 547.02          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 1,400                       | 6,800                     | 547.02          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 2,000                       | 6,800                     | 547.02          |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 340                         | 3,400                     | 547.02          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 2,000                       | 6,800                     | 547.02          |
| 10950        | Methylcyclohexane           | 108-87-2            | 3,100        | J 680                       | 3,400                     | 547.02          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Toluene                     | 108-88-3            | 1,100        | J 680                       | 3,400                     | 547.02          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 1,400                       | 3,400                     | 547.02          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 680                         | 3,400                     | 547.02          |
| 10950        | Xylene (Total)              | 1330-20-7           | 4,900        | 680                         | 3,400                     | 547.02          |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_5-8'

LLI Sample # SW 6262261  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

69-58

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Chrysene                     | 218-01-9            | 10,000       | 2,000                       | 10,000                    | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 6,100                       | 20,000                    | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 10,000                      | 31,000                    | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 20,000                      | 61,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 4,100                       | 20,000                    | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 10,000                      | 31,000                    | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 21,000       | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 4,100                       | 10,000                    | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 4,100                       | 10,000                    | 10              |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-69-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_5-8'

LLI Sample # SW 6262261  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 08:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

69-58

| CAT No. | Analysis Name                                                                                                                                                                                               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Semivolatiles                                                                                                                                                                                               | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
|         | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |              |            |                             |                           |                 |
| 10727   | Naphthalene                                                                                                                                                                                                 | 91-20-3      | 7,300      | J 2,000                     | 10,000                    | 10              |
| 10727   | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4      | N.D.       | 2,000                       | 10,000                    | 10              |
| 10727   | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2      | N.D.       | 4,100                       | 10,000                    | 10              |
| 10727   | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6     | N.D.       | 4,100                       | 10,000                    | 10              |
| 10727   | Nitrobenzene                                                                                                                                                                                                | 98-95-3      | N.D.       | 2,000                       | 10,000                    | 10              |
| 10727   | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5      | N.D.       | 2,000                       | 10,000                    | 10              |
| 10727   | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7     | N.D.       | 10,000                      | 31,000                    | 10              |
| 10727   | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7     | N.D.       | 2,000                       | 10,000                    | 10              |
| 10727   | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6      | N.D.       | 2,000                       | 10,000                    | 10              |
|         | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |              |            |                             |                           |                 |
| 10727   | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0     | N.D.       | 4,100                       | 10,000                    | 10              |
| 10727   | Pentachlorophenol                                                                                                                                                                                           | 87-86-5      | N.D.       | 10,000                      | 31,000                    | 10              |
| 10727   | Phenanthrene                                                                                                                                                                                                | 85-01-8      | 7,100      | J 2,000                     | 10,000                    | 10              |
| 10727   | Phenol                                                                                                                                                                                                      | 108-95-2     | N.D.       | 2,000                       | 10,000                    | 10              |
| 10727   | Pyrene                                                                                                                                                                                                      | 129-00-0     | 4,900      | J 2,000                     | 10,000                    | 10              |
| 10727   | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4      | N.D.       | 4,100                       | 10,000                    | 10              |
| 10727   | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2      | N.D.       | 2,000                       | 10,000                    | 10              |
|         | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |              |            |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 9,620        | 6.10         | 24.3  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.21         | 2.43  |
| 06935         | Arsenic             | 7440-38-2    | 7.18         | 1.15         | 2.43  |
| 06946         | Barium              | 7440-39-3    | 157          | 0.0485       | 0.607 |
| 06947         | Beryllium           | 7440-41-7    | 0.158        | J 0.0825     | 0.607 |
| 06949         | Cadmium             | 7440-43-9    | N.D.         | 0.170        | 0.607 |
| 01650         | Calcium             | 7440-70-2    | 14,000       | 7.44         | 24.3  |
| 06951         | Chromium            | 7440-47-3    | 32.5         | 0.716        | 1.82  |
| 06952         | Cobalt              | 7440-48-4    | 1.28         | 0.231        | 0.607 |
| 06953         | Copper              | 7440-50-8    | 192          | 0.267        | 1.21  |
| 01654         | Iron                | 7439-89-6    | 6,060        | 5.71         | 24.3  |
| 06955         | Lead                | 7439-92-1    | 98.2         | 0.728        | 1.82  |
| 01657         | Magnesium           | 7439-95-4    | 2,510        | 3.08         | 12.1  |
| 06958         | Manganese           | 7439-96-5    | 32.1         | 0.0946       | 0.607 |
| 06961         | Nickel              | 7440-02-0    | 11.4         | 0.231        | 1.21  |
| 01662         | Potassium           | 7440-09-7    | 448          | 21.8         | 60.7  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.19         | 2.43  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.218        | 0.607 |
| 01667         | Sodium              | 7440-23-5    | 61.7         | J 45.3       | 121   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.76         | 3.64  |
| 06971         | Vanadium            | 7440-62-2    | 36.6         | 0.231        | 0.607 |
| 06972         | Zinc                | 7440-66-6    | 29.4         | 0.801        | 2.43  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_5-8'

**LLI Sample #** SW 6262261  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 08:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

69-58

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result       | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                  |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.101 J | mg/kg<br>0.0033             | mg/kg<br>0.115            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                  |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>19.2        | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                  |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 07:59       | Stephanie A Selis | 547.02          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 08:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 08:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 08:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 17:19       | Brian K Graham    | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:07       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:07       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:34       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-69-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_5-8'

**LLI Sample #** SW 6262261  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 08:30 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

69-58

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin  | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:15       | Damary Valentin  | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111115711001 | 04/22/2011 06:35       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_15.5-16'

**LLI Sample #** SW 6262262  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

69-15

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 840                         | 2,400                     | 72.26           |
| 10950        | Benzene                     | 71-43-2             | 120 J        | 60                          | 600                       | 72.26           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 480                         | 1,200                     | 72.26           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | Cyclohexane                 | 110-82-7            | 500 J        | 120                         | 600                       | 72.26           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Ethylbenzene                | 100-41-4            | 310 J        | 120                         | 600                       | 72.26           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 240                         | 1,200                     | 72.26           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 360                         | 1,200                     | 72.26           |
| 10950        | Isopropylbenzene            | 98-82-8             | 620          | 120                         | 600                       | 72.26           |
| 10950        | Methyl Acetate              | 79-20-9             | 480 J        | 240                         | 600                       | 72.26           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 60                          | 600                       | 72.26           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 360                         | 1,200                     | 72.26           |
| 10950        | Methylcyclohexane           | 108-87-2            | 4,500        | 120                         | 600                       | 72.26           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Toluene                     | 108-88-3            | 900          | 120                         | 600                       | 72.26           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 240                         | 600                       | 72.26           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 120                         | 600                       | 72.26           |
| 10950        | Xylene (Total)              | 1330-20-7           | 890          | 120                         | 600                       | 72.26           |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-69-WC\_15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_15.5-16'

LLI Sample # SW 6262262  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

69-15

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 32,000       | 540                         | 2,700                     | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | 3,900        | 540                         | 2,700                     | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Anthracene                   | 120-12-7            | 21,000       | 540                         | 2,700                     | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 17,000       | 540                         | 2,700                     | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 11,000       | 540                         | 2,700                     | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 13,000       | 540                         | 2,700                     | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 5,300        | 540                         | 2,700                     | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 4,700        | 540                         | 2,700                     | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 3,800        | 540                         | 2,700                     | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Carbazole                    | 86-74-8             | 1,500        | J 540                       | 2,700                     | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Chrysene                     | 218-01-9            | 17,000       | 540                         | 2,700                     | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 2,000        | J 540                       | 2,700                     | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | 9,300        | 540                         | 2,700                     | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 1,600                       | 5,400                     | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 2,700                       | 8,200                     | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 5,400                       | 16,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 4,500        | J 1,100                     | 5,400                     | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | 39,000       | 540                         | 2,700                     | 10              |
| 10727        | Fluorene                     | 86-73-7             | 22,000       | 540                         | 2,700                     | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 2,700                       | 8,200                     | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 4,800        | 540                         | 2,700                     | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 28,000       | 540                         | 2,700                     | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | 6,400        | 1,100                       | 2,700                     | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_15.5-16'

**LLI Sample #** SW 6262262  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

69-15

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 52,000       | 540                         | 2,700                     | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 2,700                       | 8,200                     | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 540                         | 2,700                     | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 2,700                       | 8,200                     | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 66,000       | 2,700                       | 14,000                    | 50              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 540                         | 2,700                     | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 42,000       | 540                         | 2,700                     | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 1,100                       | 2,700                     | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 540                         | 2,700                     | 10              |

Reporting limits were raised due to interference from the sample matrix.

Bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration of 120 ug/kg. The blank value was not subtracted from the analytical result.

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 19,100       | 8.15         | 32.4  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.62         | 3.24  |
| 06935         | Arsenic             | 7440-38-2    | 21.7         | 1.54         | 3.24  |
| 06946         | Barium              | 7440-39-3    | 308          | 0.0648       | 0.810 |
| 06947         | Beryllium           | 7440-41-7    | 1.70         | 0.110        | 0.810 |
| 06949         | Cadmium             | 7440-43-9    | 1.67         | 0.227        | 0.810 |
| 01650         | Calcium             | 7440-70-2    | 3,760        | 9.93         | 32.4  |
| 06951         | Chromium            | 7440-47-3    | 71.4         | 0.956        | 2.43  |
| 06952         | Cobalt              | 7440-48-4    | 22.0         | 0.308        | 0.810 |
| 06953         | Copper              | 7440-50-8    | 129          | 0.357        | 1.62  |
| 01654         | Iron                | 7439-89-6    | 27,200       | 7.63         | 32.4  |
| 06955         | Lead                | 7439-92-1    | 417          | 0.972        | 2.43  |
| 01657         | Magnesium           | 7439-95-4    | 3,990        | 4.12         | 16.2  |
| 06958         | Manganese           | 7439-96-5    | 533          | 0.126        | 0.810 |
| 06961         | Nickel              | 7440-02-0    | 41.3         | 0.308        | 1.62  |
| 01662         | Potassium           | 7440-09-7    | 2,060        | 29.2         | 81.0  |
| 06936         | Selenium            | 7782-49-2    | 2.46 J       | 1.59         | 3.24  |
| 06966         | Silver              | 7440-22-4    | 0.757 J      | 0.292        | 0.810 |
| 01667         | Sodium              | 7440-23-5    | 203          | 60.4         | 162   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 2.35         | 4.86  |
| 06971         | Vanadium            | 7440-62-2    | 40.9         | 0.308        | 0.810 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_15.5-16'

**LLI Sample #** SW 6262262  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

**Submitted:** 04/19/2011 14:50

**Reported:** 05/05/2011 14:47

69-15

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 06972                                                                                                                                                                 | Zinc          | SW-846 6010B<br>7440-66-6 | mg/kg<br>544  | mg/kg<br>1.07               | mg/kg<br>3.24             | 1               |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>1.03 | mg/kg<br>0.0045             | mg/kg<br>0.158            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>39.5     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 08:22       | Stephanie A Selis | 72.26           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 09:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 17:44       | Brian K Graham    | 10              |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/22/2011 07:11       | Brian K Graham    | 50              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:18       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:18       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:44       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:18       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-69-WC\_15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-69-WC\_15.5-16'

**LLI Sample #** SW 6262262  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

69-15

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis<br>Date and Time |       | Analyst          | Dilution<br>Factor |
|------------|---------------------|--------------------------|--------|--------------|---------------------------|-------|------------------|--------------------|
|            |                     |                          |        |              |                           |       |                  |                    |
| 01662      | Potassium           | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 06936      | Selenium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 06966      | Silver              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 01667      | Sodium              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 06925      | Thallium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:18 | Damary Valentin  | 1                  |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111115711001 | 04/22/2011                | 06:36 | Damary Valentin  | 1                  |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111115708001 | 04/21/2011                | 12:14 | James L Mertz    | 1                  |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111115711001 | 04/21/2011                | 13:53 | James L Mertz    | 1                  |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11112820002A | 04/22/2011                | 18:41 | Scott W Freisher | 1                  |





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 5

**Sample Description:** BH-10-46-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_0-2'

**LLI Sample #** SW 6262263  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:15 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

46-02

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-----------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                       | ug/kg                     |                 |
| 10950   | Acetone                     | 67-64-1      | 210        | 6                           | 16                        | 0.68            |
| 10950   | Benzene                     | 71-43-2      | 12         | 0.4                         | 4                         | 0.68            |
| 10950   | Bromodichloromethane        | 75-27-4      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Bromoform                   | 75-25-2      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Bromomethane                | 74-83-9      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | 2-Butanone                  | 78-93-3      | 29         | 3                           | 8                         | 0.68            |
| 10950   | Carbon Disulfide            | 75-15-0      | 2          | 0.8                         | 4                         | 0.68            |
| 10950   | Carbon Tetrachloride        | 56-23-5      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Chlorobenzene               | 108-90-7     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Chloroethane                | 75-00-3      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Chloroform                  | 67-66-3      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Chloromethane               | 74-87-3      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Cyclohexane                 | 110-82-7     | 14         | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Dibromochloromethane        | 124-48-1     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Ethylbenzene                | 100-41-4     | 24         | 0.8                         | 4                         | 0.68            |
| 10950   | Freon 113                   | 76-13-1      | N.D.       | 2                           | 8                         | 0.68            |
| 10950   | 2-Hexanone                  | 591-78-6     | N.D.       | 2                           | 8                         | 0.68            |
| 10950   | Isopropylbenzene            | 98-82-8      | 5          | 0.8                         | 4                         | 0.68            |
| 10950   | Methyl Acetate              | 79-20-9      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | N.D.       | 0.4                         | 4                         | 0.68            |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | N.D.       | 2                           | 8                         | 0.68            |
| 10950   | Methylcyclohexane           | 108-87-2     | 44         | 0.8                         | 4                         | 0.68            |
| 10950   | Methylene Chloride          | 75-09-2      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Styrene                     | 100-42-5     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Tetrachloroethene           | 127-18-4     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Toluene                     | 108-88-3     | 73         | 0.8                         | 4                         | 0.68            |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Trichloroethene             | 79-01-6      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Trichlorofluoromethane      | 75-69-4      | N.D.       | 2                           | 4                         | 0.68            |
| 10950   | Vinyl Chloride              | 75-01-4      | N.D.       | 0.8                         | 4                         | 0.68            |
| 10950   | Xylene (Total)              | 1330-20-7    | 120        | 0.8                         | 4                         | 0.68            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_0-2'

LLI Sample # SW 6262263  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 1,100                       | 3,800                     | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,900                       | 5,700                     | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 3,800                       | 11,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 760                         | 3,800                     | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,900                       | 5,700                     | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 760                         | 1,900                     | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_0-2'

**LLI Sample #** SW 6262263  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,900                       | 5,700                     | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 380                         | 1,900                     | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,900                       | 5,700                     | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 380                         | 1,900                     | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 760                         | 1,900                     | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 380                         | 1,900                     | 10              |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 24,600       | 5.54         | 22.0  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.10         | 2.20  |
| 06935         | Arsenic             | 7440-38-2    | 8.36         | 1.05         | 2.20  |
| 06946         | Barium              | 7440-39-3    | 103          | 0.0440       | 0.551 |
| 06947         | Beryllium           | 7440-41-7    | 1.40         | 0.0749       | 0.551 |
| 06949         | Cadmium             | 7440-43-9    | N.D.         | 0.154        | 0.551 |
| 01650         | Calcium             | 7440-70-2    | 13,100       | 6.75         | 22.0  |
| 06951         | Chromium            | 7440-47-3    | 45.3         | 0.650        | 1.65  |
| 06952         | Cobalt              | 7440-48-4    | 11.8         | 0.209        | 0.551 |
| 06953         | Copper              | 7440-50-8    | 37.1         | 0.242        | 1.10  |
| 01654         | Iron                | 7439-89-6    | 34,100       | 25.9         | 110   |
| 06955         | Lead                | 7439-92-1    | 48.5         | 0.661        | 1.65  |
| 01657         | Magnesium           | 7439-95-4    | 8,710        | 2.80         | 11.0  |
| 06958         | Manganese           | 7439-96-5    | 861          | 0.0859       | 0.551 |
| 06961         | Nickel              | 7440-02-0    | 27.3         | 0.209        | 1.10  |
| 01662         | Potassium           | 7440-09-7    | 1,350        | 19.8         | 55.1  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.08         | 2.20  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.198        | 0.551 |
| 01667         | Sodium              | 7440-23-5    | 72.1         | 41.1         | 110   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.60         | 3.30  |
| 06971         | Vanadium            | 7440-62-2    | 50.3         | 0.209        | 0.551 |
| 06972         | Zinc                | 7440-66-6    | 67.7         | 0.727        | 2.20  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_0-2'

**LLI Sample #** SW 6262263  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

46-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result        | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|-------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                   |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.0540 J | mg/kg<br>0.0031             | mg/kg<br>0.109            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                   |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>13.5         | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                   |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111151AA    | 04/25/2011 19:16       | Sara E Johnson   | 0.68            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:15       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:15       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 09:15       | Client Supplied  | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 18:09       | Brian K Graham   | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto    | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:22       | John W Yanzuk II | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:22       | John W Yanzuk II | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:51       | John W Yanzuk II | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:48       | John W Yanzuk II | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-46-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_0-2'

**LLI Sample #** SW 6262263  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

46-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:22       | Damary Valentin  | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111115711001 | 04/22/2011 06:37       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

**Sample Description:** BH-10-46-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_5-8'

LLI Sample # SW 6262264  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-58

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 4,700                       | 14,000                    | 558.47          |
| 10950        | Benzene                     | 71-43-2             | 1,100        | J 340                       | 3,400                     | 558.47          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 2,700                       | 6,800                     | 558.47          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | Cyclohexane                 | 110-82-7            | 770          | J 680                       | 3,400                     | 558.47          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 1,400                       | 6,800                     | 558.47          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 2,000                       | 6,800                     | 558.47          |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Methyl Acetate              | 79-20-9             | 6,600        | 1,400                       | 3,400                     | 558.47          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 340                         | 3,400                     | 558.47          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 2,000                       | 6,800                     | 558.47          |
| 10950        | Methylcyclohexane           | 108-87-2            | 1,600        | J 680                       | 3,400                     | 558.47          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Toluene                     | 108-88-3            | 3,300        | J 680                       | 3,400                     | 558.47          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 1,400                       | 3,400                     | 558.47          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 680                         | 3,400                     | 558.47          |
| 10950        | Xylene (Total)              | 1330-20-7           | 7,300        | 680                         | 3,400                     | 558.47          |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_5-8'

LLI Sample # SW 6262264  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-58

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 7,300        | J 2,000                     | 10,000                    | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 2,400        | J 2,000                     | 10,000                    | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Chrysene                     | 218-01-9            | 14,000       | 2,000                       | 10,000                    | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 6,000                       | 20,000                    | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 10,000                      | 30,000                    | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 20,000                      | 60,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 4,000                       | 20,000                    | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 10,000                      | 30,000                    | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 39,000       | 2,000                       | 10,000                    | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 4,000                       | 10,000                    | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_5-8'

LLI Sample # SW 6262264  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-58

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 16,000       | 2,000                       | 10,000                    | 10              |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 10,000                      | 30,000                    | 10              |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 2,000                       | 10,000                    | 10              |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 10,000                      | 30,000                    | 10              |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 9,400        | J 2,000                     | 10,000                    | 10              |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,000                       | 10,000                    | 10              |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 6,100        | J 2,000                     | 10,000                    | 10              |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 4,000                       | 10,000                    | 10              |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,000                       | 10,000                    | 10              |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 7,050        | 5.98                        | 23.8                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.19                        | 2.38                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 6.14         | 1.13                        | 2.38                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 116          | 0.0475                      | 0.594                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.103        | J 0.0808                    | 0.594                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.166                       | 0.594                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 9,240        | 7.28                        | 23.8                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 20.1         | 0.701                       | 1.78                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 1.01         | 0.226                       | 0.594                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 165          | 0.261                       | 1.19                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 4,770        | 5.60                        | 23.8                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 79.6         | 0.713                       | 1.78                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 2,330        | 3.02                        | 11.9                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 110          | 0.0927                      | 0.594                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 9.31         | 0.226                       | 1.19                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 397          | 21.4                        | 59.4                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.16                        | 2.38                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.214                       | 0.594                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 114          | J 44.3                      | 119                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.72                        | 3.57                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 19.8         | 0.226                       | 0.594                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 21.3         | 0.784                       | 2.38                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-46-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_5-8'

**LLI Sample #** SW 6262264  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

46-58

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result        | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|-------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                   |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.0629 J | mg/kg<br>0.0033             | mg/kg<br>0.115            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                   |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>17.5         | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                   |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 08:45       | Stephanie A Selis | 558.47          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 09:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 09:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 18:34       | Brian K Graham    | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:26       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:26       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:54       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-46-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_5-8'

**LLI Sample #** SW 6262264  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 09:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

46-58

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin  | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:32       | Damary Valentin  | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111115711001 | 04/22/2011 06:38       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_17-18' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_17-18'

**LLI Sample #** SW 6262265  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

46-17

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 1,100        | 17                          | 48                        | 1.14            |
| 10950        | Benzene                     | 71-43-2             | 58           | 1                           | 12                        | 1.14            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | 2-Butanone                  | 78-93-3             | 260          | 10                          | 24                        | 1.14            |
| 10950        | Carbon Disulfide            | 75-15-0             | 33           | 2                           | 12                        | 1.14            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Cyclohexane                 | 110-82-7            | 41           | 2                           | 12                        | 1.14            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Ethylbenzene                | 100-41-4            | 100          | 2                           | 12                        | 1.14            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 5                           | 24                        | 1.14            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 7                           | 24                        | 1.14            |
| 10950        | Isopropylbenzene            | 98-82-8             | 25           | 2                           | 12                        | 1.14            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 1                           | 12                        | 1.14            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 7                           | 24                        | 1.14            |
| 10950        | Methylcyclohexane           | 108-87-2            | 120          | 2                           | 12                        | 1.14            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Toluene                     | 108-88-3            | 240          | 2                           | 12                        | 1.14            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 5                           | 12                        | 1.14            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 2                           | 12                        | 1.14            |
| 10950        | Xylene (Total)              | 1330-20-7           | 500          | 2                           | 12                        | 1.14            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_17-18' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_17-18'

**LLI Sample #** SW 6262265  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-17

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 70                          | 350                       | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 140                         | 350                       | 1               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 70                          | 350                       | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 140                         | 350                       | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 110 J        | 70                          | 350                       | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 210 J        | 70                          | 350                       | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 76 J         | 70                          | 350                       | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 70                          | 350                       | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 100 J        | 70                          | 350                       | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 140                         | 350                       | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 140                         | 350                       | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 70                          | 350                       | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 140                         | 350                       | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 140                         | 350                       | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 70                          | 350                       | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 70                          | 350                       | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 70                          | 350                       | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 70                          | 350                       | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 70                          | 350                       | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Chrysene                     | 218-01-9            | 460          | 70                          | 350                       | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 70                          | 350                       | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | 82 J         | 70                          | 350                       | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 210                         | 700                       | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 140                         | 350                       | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 140                         | 350                       | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 140                         | 350                       | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 350                         | 1,000                     | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 700                         | 2,100                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 140                         | 350                       | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 70                          | 350                       | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 170 J        | 140                         | 700                       | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 89 J         | 70                          | 350                       | 1               |
| 10727        | Fluorene                     | 86-73-7             | 110 J        | 70                          | 350                       | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 140                         | 350                       | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 350                         | 1,000                     | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 70                          | 350                       | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 70                          | 350                       | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 70                          | 350                       | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 1,800        | 70                          | 350                       | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 140                         | 350                       | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 140                         | 350                       | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-46-WC\_17-18' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_17-18'

**LLI Sample #** SW 6262265  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

46-17

| CAT No.       | Analysis Name                                                                                                                                                                                                                                                                                                                                                                                                    | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                                                                                                                                                                                                                             | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.                                                                                                                                                                                                      |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                                                                                                                                                                                                                      | 91-20-3             | 1,300        | 70                          | 350                       | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                   | 88-74-4             | N.D.         | 70                          | 350                       | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                   | 99-09-2             | N.D.         | 140                         | 350                       | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                   | 100-01-6            | N.D.         | 140                         | 350                       | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                                                                                                                                                                                                                     | 98-95-3             | N.D.         | 70                          | 350                       | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                                                                                                                                                                                                                                    | 88-75-5             | N.D.         | 70                          | 350                       | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                                                                                                                                                                                                                                    | 100-02-7            | N.D.         | 350                         | 1,000                     | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                                                                                                                                                                                                                       | 621-64-7            | N.D.         | 70                          | 350                       | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                                                                                                                                                                                                                           | 86-30-6             | N.D.         | 70                          | 350                       | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                                                                                                                                                                                                                         |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                                                                                                                                                                                                                              | 117-84-0            | N.D.         | 140                         | 350                       | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                                                                                                                                                                                                                                | 87-86-5             | N.D.         | 350                         | 1,000                     | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                                                                                                                                                                                                                     | 85-01-8             | 1,300        | 70                          | 350                       | 1               |
| 10727         | Phenol                                                                                                                                                                                                                                                                                                                                                                                                           | 108-95-2            | N.D.         | 70                          | 350                       | 1               |
| 10727         | Pyrene                                                                                                                                                                                                                                                                                                                                                                                                           | 129-00-0            | 200 J        | 70                          | 350                       | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                                                                                                                                                                                                                            | 95-95-4             | N.D.         | 140                         | 350                       | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                                                                                                                                                                                                                            | 88-06-2             | N.D.         | 70                          | 350                       | 1               |
|               | Bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration of 120 ug/kg. The blank value was not subtracted from the analytical result. This sample was re-extracted outside of the method required holding time, and bis(2-ethylhexyl)phthalate was not detected in the method blank or the re-analysis of the sample. The data reported here is from the initial extraction of the sample. |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                                                                                                                                                                                                                              |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                                                                                                                                                                                                                         | 7429-90-5           | 37,400       | 10.4                        | 41.5                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                                                                                                                                                                                                                         | 7440-36-0           | N.D.         | 2.08                        | 4.15                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                                                                                                                                                                                                                          | 7440-38-2           | 57.3         | 1.97                        | 4.15                      | 1               |
| 06946         | Barium                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-39-3           | 1,180        | 0.0830                      | 1.04                      | 1               |
| 06947         | Beryllium                                                                                                                                                                                                                                                                                                                                                                                                        | 7440-41-7           | 1.04         | 0.141                       | 1.04                      | 1               |
| 06949         | Cadmium                                                                                                                                                                                                                                                                                                                                                                                                          | 7440-43-9           | 0.897 J      | 0.291                       | 1.04                      | 1               |
| 01650         | Calcium                                                                                                                                                                                                                                                                                                                                                                                                          | 7440-70-2           | 183,000      | 63.6                        | 208                       | 5               |
| 06951         | Chromium                                                                                                                                                                                                                                                                                                                                                                                                         | 7440-47-3           | 236          | 1.22                        | 3.11                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-48-4           | 13.3         | 0.394                       | 1.04                      | 1               |
| 06953         | Copper                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-50-8           | 409          | 0.457                       | 2.08                      | 1               |
| 01654         | Iron                                                                                                                                                                                                                                                                                                                                                                                                             | 7439-89-6           | 16,700       | 9.78                        | 41.5                      | 1               |
| 06955         | Lead                                                                                                                                                                                                                                                                                                                                                                                                             | 7439-92-1           | 1,400        | 1.25                        | 3.11                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                                                                                                                                                                                                                        | 7439-95-4           | 36,600       | 5.27                        | 20.8                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                                                                                                                                                                                                                        | 7439-96-5           | 1,030        | 0.162                       | 1.04                      | 1               |
| 06961         | Nickel                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-02-0           | 221          | 0.394                       | 2.08                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                                                                                                                                                                                                                        | 7440-09-7           | 243          | 37.4                        | 104                       | 1               |
| 06936         | Selenium                                                                                                                                                                                                                                                                                                                                                                                                         | 7782-49-2           | N.D.         | 2.03                        | 4.15                      | 1               |
| 06966         | Silver                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-22-4           | 1.26         | 0.374                       | 1.04                      | 1               |
| 01667         | Sodium                                                                                                                                                                                                                                                                                                                                                                                                           | 7440-23-5           | 653          | 77.4                        | 208                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                                                                                                                                                                                                                         | 7440-28-0           | N.D.         | 3.01                        | 6.23                      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_17-18' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_17-18'

**LLI Sample #** SW 6262265  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

46-17

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                             |                           |                 |
| 06971                                                                                                                                                                 | Vanadium      | 7440-62-2  | mg/kg      | mg/kg                       | mg/kg                     |                 |
| 06972                                                                                                                                                                 | Zinc          | 7440-66-6  | 488        | 0.394                       | 1.04                      | 1               |
|                                                                                                                                                                       |               |            | 570        | 1.37                        | 4.15                      | 1               |
| <b>SW-846 6010B</b>                                                                                                                                                   |               |            |            |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | mg/kg      | mg/kg                       | mg/kg                     |                 |
|                                                                                                                                                                       |               |            | 0.0304 J   | 0.0058                      | 0.203                     | 1               |
| <b>SW-846 7471A</b>                                                                                                                                                   |               |            |            |                             |                           |                 |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | %          | %                           | %                         |                 |
|                                                                                                                                                                       |               |            | 52.3       | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 10950   | TCL(4.3)by 8260 (soil)         | SW-846 8260B | 1      | X111151AA    | 04/25/2011 19:39       | Sara E Johnson   | 1.14            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 10:00       | Client Supplied  | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 18:59       | Brian K Graham   | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto    | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:29       | John W Yanzuk II | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:34       | John W Yanzuk II | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:29       | John W Yanzuk II | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 23:58       | John W Yanzuk II | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:35       | Damary Valentin  | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-46-WC\_17-18' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-46-WC\_17-18'

**LLI Sample #** SW 6262265  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

46-17

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis<br>Date and Time |       | Analyst          | Dilution<br>Factor |
|------------|---------------------|--------------------------|--------|--------------|---------------------------|-------|------------------|--------------------|
|            |                     |                          |        |              |                           |       |                  |                    |
| 01662      | Potassium           | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 06936      | Selenium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 06966      | Silver              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 01667      | Sodium              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 06925      | Thallium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111115708001 | 04/24/2011                | 11:35 | Damary Valentin  | 1                  |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111115711001 | 04/22/2011                | 06:40 | Damary Valentin  | 1                  |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111115708001 | 04/21/2011                | 12:14 | James L Mertz    | 1                  |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111115711001 | 04/21/2011                | 13:53 | James L Mertz    | 1                  |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11112820002A | 04/22/2011                | 18:41 | Scott W Freisher | 1                  |

**Sample Description:** BH-10-44-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_0-2'

**LLI Sample #** SW 6262266  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

**Submitted:** 04/19/2011 14:50

**Reported:** 05/05/2011 14:47

44-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 380                         | 1,100                     | 44.95           |
| 10950        | Benzene                     | 71-43-2             | 33 J         | 27                          | 270                       | 44.95           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 220                         | 540                       | 44.95           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Ethylbenzene                | 100-41-4            | 140 J        | 54                          | 270                       | 44.95           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 110                         | 540                       | 44.95           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 160                         | 540                       | 44.95           |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Methyl Acetate              | 79-20-9             | 460          | 110                         | 270                       | 44.95           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 27                          | 270                       | 44.95           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 160                         | 540                       | 44.95           |
| 10950        | Methylcyclohexane           | 108-87-2            | 85 J         | 54                          | 270                       | 44.95           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Toluene                     | 108-88-3            | 300          | 54                          | 270                       | 44.95           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 110                         | 270                       | 44.95           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 54                          | 270                       | 44.95           |
| 10950        | Xylene (Total)              | 1330-20-7           | 910          | 54                          | 270                       | 44.95           |

Reporting limits were raised due to interference from the sample matrix.

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-44-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_0-2'

LLI Sample # SW 6262266  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

44-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 40                          | 200                       | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 40                          | 200                       | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 79                          | 200                       | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 69 J         | 40                          | 200                       | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 180 J        | 40                          | 200                       | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 85 J         | 40                          | 200                       | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 42 J         | 40                          | 200                       | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 40                          | 200                       | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 40                          | 200                       | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 40                          | 200                       | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 79                          | 200                       | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 40                          | 200                       | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 40                          | 200                       | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 40                          | 200                       | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 40                          | 200                       | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 40                          | 200                       | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Chrysene                     | 218-01-9            | 350          | 40                          | 200                       | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 40                          | 200                       | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 40                          | 200                       | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 120                         | 400                       | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 79                          | 200                       | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 200                         | 600                       | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 400                         | 1,200                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 79                          | 200                       | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 40                          | 200                       | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 200 J        | 79                          | 400                       | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 58 J         | 40                          | 200                       | 1               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 40                          | 200                       | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 79                          | 200                       | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 200                         | 600                       | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 40                          | 200                       | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 40                          | 200                       | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 40                          | 200                       | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 2,100        | 40                          | 200                       | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 79                          | 200                       | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 79                          | 200                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_0-2'

LLI Sample # SW 6262266  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-02

| CAT No. | Analysis Name                                                                                                                                                                                                                                                                                                                                                                                                                                             | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Semivolatiles                                                                                                                                                                                                                                                                                                                                                                                                                                             | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
|         | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.                                                                                                                                                                                                                                               |              |            |                             |                           |                 |
| 10727   | Naphthalene                                                                                                                                                                                                                                                                                                                                                                                                                                               | 91-20-3      | 880        | 40                          | 200                       | 1               |
| 10727   | 2-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                                                            | 88-74-4      | N.D.       | 40                          | 200                       | 1               |
| 10727   | 3-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                                                            | 99-09-2      | N.D.       | 79                          | 200                       | 1               |
| 10727   | 4-Nitroaniline                                                                                                                                                                                                                                                                                                                                                                                                                                            | 100-01-6     | N.D.       | 79                          | 200                       | 1               |
| 10727   | Nitrobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                              | 98-95-3      | N.D.       | 40                          | 200                       | 1               |
| 10727   | 2-Nitrophenol                                                                                                                                                                                                                                                                                                                                                                                                                                             | 88-75-5      | N.D.       | 40                          | 200                       | 1               |
| 10727   | 4-Nitrophenol                                                                                                                                                                                                                                                                                                                                                                                                                                             | 100-02-7     | N.D.       | 200                         | 600                       | 1               |
| 10727   | N-Nitroso-di-n-propylamine                                                                                                                                                                                                                                                                                                                                                                                                                                | 621-64-7     | N.D.       | 40                          | 200                       | 1               |
| 10727   | N-Nitrosodiphenylamine                                                                                                                                                                                                                                                                                                                                                                                                                                    | 86-30-6      | N.D.       | 40                          | 200                       | 1               |
|         | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                                                                                                                                                                                                                                                                  |              |            |                             |                           |                 |
| 10727   | Di-n-octylphthalate                                                                                                                                                                                                                                                                                                                                                                                                                                       | 117-84-0     | N.D.       | 79                          | 200                       | 1               |
| 10727   | Pentachlorophenol                                                                                                                                                                                                                                                                                                                                                                                                                                         | 87-86-5      | N.D.       | 200                         | 600                       | 1               |
| 10727   | Phenanthrene                                                                                                                                                                                                                                                                                                                                                                                                                                              | 85-01-8      | 260        | 40                          | 200                       | 1               |
| 10727   | Phenol                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 108-95-2     | N.D.       | 40                          | 200                       | 1               |
| 10727   | Pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 129-00-0     | 130 J      | 40                          | 200                       | 1               |
| 10727   | 2,4,5-Trichlorophenol                                                                                                                                                                                                                                                                                                                                                                                                                                     | 95-95-4      | N.D.       | 79                          | 200                       | 1               |
| 10727   | 2,4,6-Trichlorophenol                                                                                                                                                                                                                                                                                                                                                                                                                                     | 88-06-2      | N.D.       | 40                          | 200                       | 1               |
|         | Bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration of 120 ug/kg. The blank value was not subtracted from the analytical result. This sample was re-extracted outside of the method required holding time, and bis(2-ethylhexyl)phthalate was not detected in the method blank. Bis(2-ethylhexyl)phthalate was detected in the re-analysis of the sample. The data reported here is from the initial extraction of the sample. |              |            |                             |                           |                 |
| Metals  | SW-846 6010B                                                                                                                                                                                                                                                                                                                                                                                                                                              |              | mg/kg      | mg/kg                       | mg/kg                     |                 |
| 01643   | Aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7429-90-5    | 19,400     | 5.86                        | 23.3                      | 1               |
| 06944   | Antimony                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7440-36-0    | N.D.       | 1.16                        | 2.33                      | 1               |
| 06935   | Arsenic                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7440-38-2    | 6.77       | 1.11                        | 2.33                      | 1               |
| 06946   | Barium                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-39-3    | 122        | 0.0466                      | 0.582                     | 1               |
| 06947   | Beryllium                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7440-41-7    | 2.40       | 0.0792                      | 0.582                     | 1               |
| 06949   | Cadmium                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7440-43-9    | N.D.       | 0.163                       | 0.582                     | 1               |
| 01650   | Calcium                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7440-70-2    | 34,500     | 7.14                        | 23.3                      | 1               |
| 06951   | Chromium                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7440-47-3    | 19.3       | 0.687                       | 1.75                      | 1               |
| 06952   | Cobalt                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-48-4    | 11.7       | 0.221                       | 0.582                     | 1               |
| 06953   | Copper                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-50-8    | 33.2       | 0.256                       | 1.16                      | 1               |
| 01654   | Iron                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7439-89-6    | 41,000     | 27.4                        | 116                       | 5               |
| 06955   | Lead                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7439-92-1    | 22.3       | 0.698                       | 1.75                      | 1               |
| 01657   | Magnesium                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7439-95-4    | 17,200     | 2.96                        | 11.6                      | 1               |
| 06958   | Manganese                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7439-96-5    | 2,040      | 0.454                       | 2.91                      | 5               |
| 06961   | Nickel                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-02-0    | 25.8       | 0.221                       | 1.16                      | 1               |
| 01662   | Potassium                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7440-09-7    | 1,230      | 21.0                        | 58.2                      | 1               |
| 06936   | Selenium                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7782-49-2    | N.D.       | 1.14                        | 2.33                      | 1               |
| 06966   | Silver                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-22-4    | N.D.       | 0.210                       | 0.582                     | 1               |
| 01667   | Sodium                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7440-23-5    | 80.0 J     | 43.4                        | 116                       | 1               |
| 06925   | Thallium                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7440-28-0    | N.D.       | 1.69                        | 3.49                      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_0-2'

LLI Sample # SW 6262266  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number             | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                        |            |                             |                           |                 |
| 06971                                                                                                                                                                 | Vanadium      | SW-846 6010B 7440-62-2 | mg/kg 40.5 | mg/kg 0.221                 | mg/kg 0.582               | 1               |
| 06972                                                                                                                                                                 | Zinc          | 7440-66-6              | 88.1       | 0.768                       | 2.33                      | 1               |
| <b>SW-846 7471A</b>                                                                                                                                                   |               |                        |            |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6              | 0.0693 J   | 0.0034                      | 0.118                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                        |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G n.a.       | % 16.6     | % 0.50                      | % 0.50                    | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                        |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260 (soil)         | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 06:27       | Stephanie A Selis | 44.95           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 10:20       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 19:24       | Brian K Graham    | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:37       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:37       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:42       | John W Yanzuk II  | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/28/2011 00:01       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:42       | John W Yanzuk II  | 5               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:39       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_0-2'

**LLI Sample #** SW 6262266  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

44-02

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis   |       | Analyst          | Dilution<br>Factor |
|------------|---------------------|--------------------------|--------|--------------|------------|-------|------------------|--------------------|
|            |                     |                          |        |              | Date       | Time  |                  |                    |
| 01662      | Potassium           | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 06936      | Selenium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 06966      | Silver              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 01667      | Sodium              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 06925      | Thallium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111115708001 | 04/24/2011 | 11:39 | Damary Valentin  | 1                  |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111115711001 | 04/22/2011 | 06:43 | Damary Valentin  | 1                  |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111115708001 | 04/21/2011 | 12:14 | James L Mertz    | 1                  |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111115711001 | 04/21/2011 | 13:53 | James L Mertz    | 1                  |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11112820002A | 04/22/2011 | 18:41 | Scott W Freisher | 1                  |



**Sample Description:** BH-10-44-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_10-12'

**LLI Sample #** SW 6262267  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-10

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 2,500                       | 7,100                     | 172.44          |
| 10950        | Benzene                     | 71-43-2             | 8,100        | 180                         | 1,800                     | 172.44          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 1,400                       | 3,600                     | 172.44          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Cyclohexane                 | 110-82-7            | 13,000       | 360                         | 1,800                     | 172.44          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Ethylbenzene                | 100-41-4            | 76,000       | 360                         | 1,800                     | 172.44          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 710                         | 3,600                     | 172.44          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 1,100                       | 3,600                     | 172.44          |
| 10950        | Isopropylbenzene            | 98-82-8             | 20,000       | 360                         | 1,800                     | 172.44          |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 180                         | 1,800                     | 172.44          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 1,100                       | 3,600                     | 172.44          |
| 10950        | Methylcyclohexane           | 108-87-2            | 63,000       | 360                         | 1,800                     | 172.44          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Toluene                     | 108-88-3            | 140,000      | 3,600                       | 18,000                    | 172.44          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 710                         | 1,800                     | 172.44          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 360                         | 1,800                     | 172.44          |
| 10950        | Xylene (Total)              | 1330-20-7           | 460,000      | 3,600                       | 18,000                    | 172.44          |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_10-12'

**LLI Sample #** SW 6262267  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-10

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 66,000       | 4,100                       | 21,000                    | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Anthracene                   | 120-12-7            | 32,000       | 4,100                       | 21,000                    | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 8,400        | J 4,100                     | 21,000                    | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 98,000       | 4,100                       | 21,000                    | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Chrysene                     | 218-01-9            | 16,000       | J 4,100                     | 21,000                    | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | 57,000       | 4,100                       | 21,000                    | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 12,000                      | 41,000                    | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 21,000                      | 62,000                    | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 41,000                      | 120,000                   | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 8,300                       | 41,000                    | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | 6,300        | J 4,100                     | 21,000                    | 10              |
| 10727        | Fluorene                     | 86-73-7             | 96,000       | 4,100                       | 21,000                    | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 21,000                      | 62,000                    | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 1,500,000    | 21,000                      | 100,000                   | 50              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 8,300                       | 21,000                    | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_10-12'

**LLI Sample #** SW 6262267  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 10:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

44-10

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 410,000      | 4,100                       | 21,000                    | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 21,000                      | 62,000                    | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 4,100                       | 21,000                    | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 21,000                      | 62,000                    | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 200,000      | 4,100                       | 21,000                    | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 4,100                       | 21,000                    | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 21,000       | J 4,100                     | 21,000                    | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 8,300                       | 21,000                    | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 4,100                       | 21,000                    | 10              |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |      |
|---------------|---------------------|--------------|--------------|--------------|------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |      |
| 01643         | Aluminum            | 7429-90-5    | 20,400       | 10.3         | 41.0 |
| 06944         | Antimony            | 7440-36-0    | 4.02 J       | 2.05         | 4.10 |
| 06935         | Arsenic             | 7440-38-2    | 21.9         | 1.95         | 4.10 |
| 06946         | Barium              | 7440-39-3    | 349          | 0.0820       | 1.02 |
| 06947         | Beryllium           | 7440-41-7    | 0.664 J      | 0.139        | 1.02 |
| 06949         | Cadmium             | 7440-43-9    | 0.744 J      | 0.287        | 1.02 |
| 01650         | Calcium             | 7440-70-2    | 140,000      | 62.8         | 205  |
| 06951         | Chromium            | 7440-47-3    | 908          | 1.21         | 3.07 |
| 06952         | Cobalt              | 7440-48-4    | 10.2         | 0.389        | 1.02 |
| 06953         | Copper              | 7440-50-8    | 191          | 0.451        | 2.05 |
| 01654         | Iron                | 7439-89-6    | 16,200       | 9.66         | 41.0 |
| 06955         | Lead                | 7439-92-1    | 640          | 1.23         | 3.07 |
| 01657         | Magnesium           | 7439-95-4    | 47,000       | 5.21         | 20.5 |
| 06958         | Manganese           | 7439-96-5    | 937          | 0.160        | 1.02 |
| 06961         | Nickel              | 7440-02-0    | 53.4         | 0.389        | 2.05 |
| 01662         | Potassium           | 7440-09-7    | 990          | 36.9         | 102  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 2.01         | 4.10 |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.369        | 1.02 |
| 01667         | Sodium              | 7440-23-5    | 269          | 76.5         | 205  |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 2.97         | 6.15 |
| 06971         | Vanadium            | 7440-62-2    | 100          | 0.389        | 1.02 |
| 06972         | Zinc                | 7440-66-6    | 870          | 1.35         | 4.10 |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_10-12'

**LLI Sample #** SW 6262267  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

44-10

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>1.07 | mg/kg<br>0.0058             | mg/kg<br>0.203            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>51.7     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 13:12       | Stephanie A Selis | 172.44          |
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 13:35       | Stephanie A Selis | 1724.4          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 10:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 10:40       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 19:49       | Brian K Graham    | 10              |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/22/2011 07:36       | Brian K Graham    | 50              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:45       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:50       | John W Yanzuk II  | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:45       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/28/2011 00:05       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:43       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-44-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_10-12'

**LLI Sample #** SW 6262267  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 10:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

44-10

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis      |       | Analyst          | Dilution<br>Factor |
|------------|---------------------|--------------------------|--------|--------------|---------------|-------|------------------|--------------------|
|            |                     |                          |        |              | Date and Time |       |                  |                    |
| 01667      | Sodium              | SW-846 6010B             | 1      | 111115708001 | 04/24/2011    | 11:43 | Damary Valentin  | 1                  |
| 06925      | Thallium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011    | 11:43 | Damary Valentin  | 1                  |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111115708001 | 04/24/2011    | 11:43 | Damary Valentin  | 1                  |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111115708001 | 04/24/2011    | 11:43 | Damary Valentin  | 1                  |
| 00159      | Mercury             | SW-846 7471A             | 1      | 111115711001 | 04/22/2011    | 06:44 | Damary Valentin  | 1                  |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111115708001 | 04/21/2011    | 12:14 | James L Mertz    | 1                  |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111115711001 | 04/21/2011    | 13:53 | James L Mertz    | 1                  |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11112820002A | 04/22/2011    | 18:41 | Scott W Freisher | 1                  |

**Sample Description:** BH-10-44-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_24-26'

**LLI Sample #** SW 6262268  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-24

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 730                         | 2,100                     | 70.49           |
| 10950        | Benzene                     | 71-43-2             | 98 J         | 52                          | 520                       | 70.49           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 420                         | 1,000                     | 70.49           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | Cyclohexane                 | 110-82-7            | 420 J        | 100                         | 520                       | 70.49           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Ethylbenzene                | 100-41-4            | 260 J        | 100                         | 520                       | 70.49           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 210                         | 1,000                     | 70.49           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 310                         | 1,000                     | 70.49           |
| 10950        | Isopropylbenzene            | 98-82-8             | 460 J        | 100                         | 520                       | 70.49           |
| 10950        | Methyl Acetate              | 79-20-9             | 440 J        | 210                         | 520                       | 70.49           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 52                          | 520                       | 70.49           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 310                         | 1,000                     | 70.49           |
| 10950        | Methylcyclohexane           | 108-87-2            | 4,000        | 100                         | 520                       | 70.49           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Toluene                     | 108-88-3            | 800          | 100                         | 520                       | 70.49           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 210                         | 520                       | 70.49           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 100                         | 520                       | 70.49           |
| 10950        | Xylene (Total)              | 1330-20-7           | 900          | 100                         | 520                       | 70.49           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_24-26'

**LLI Sample #** SW 6262268  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

44-24

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 22,000       | 480                         | 2,400                     | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | 3,400        | 480                         | 2,400                     | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Anthracene                   | 120-12-7            | 16,000       | 480                         | 2,400                     | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 14,000       | 480                         | 2,400                     | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 9,000        | 480                         | 2,400                     | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 10,000       | 480                         | 2,400                     | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 4,300        | 480                         | 2,400                     | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 5,000        | 480                         | 2,400                     | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 2,800        | 480                         | 2,400                     | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Carbazole                    | 86-74-8             | 1,400        | J 480                       | 2,400                     | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Chrysene                     | 218-01-9            | 13,000       | 480                         | 2,400                     | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 1,500        | J 480                       | 2,400                     | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | 7,500        | 480                         | 2,400                     | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 1,500                       | 4,800                     | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 2,400                       | 7,300                     | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 4,800                       | 15,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 1,300        | J 970                       | 4,800                     | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | 32,000       | 480                         | 2,400                     | 10              |
| 10727        | Fluorene                     | 86-73-7             | 17,000       | 480                         | 2,400                     | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 2,400                       | 7,300                     | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 4,000        | 480                         | 2,400                     | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 21,000       | 480                         | 2,400                     | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | 5,000        | 970                         | 2,400                     | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_24-26'

**LLI Sample #** SW 6262268  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 11:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

44-24

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 41,000       | 480                         | 2,400                     | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 2,400                       | 7,300                     | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 480                         | 2,400                     | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 2,400                       | 7,300                     | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 58,000       | 480                         | 2,400                     | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 480                         | 2,400                     | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 32,000       | 480                         | 2,400                     | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 970                         | 2,400                     | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 480                         | 2,400                     | 10              |

Reporting limits were raised due to interference from the sample matrix.

Bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration of 120 ug/kg. The blank value was not subtracted from the analytical result. This sample was re-extracted outside of the method required holding time, and bis(2-ethylhexyl)phthalate was not detected in the method blank. Bis(2-ethylhexyl)phthalate was detected in the re-analysis of the sample. The data reported here is from the initial extraction of the sample.

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 15,400       | 7.43         | 29.5  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.48         | 2.95  |
| 06935         | Arsenic             | 7440-38-2    | 17.6         | 1.40         | 2.95  |
| 06946         | Barium              | 7440-39-3    | 259          | 0.0591       | 0.739 |
| 06947         | Beryllium           | 7440-41-7    | 1.41         | 0.100        | 0.739 |
| 06949         | Cadmium             | 7440-43-9    | 1.26         | 0.207        | 0.739 |
| 01650         | Calcium             | 7440-70-2    | 3,250        | 9.05         | 29.5  |
| 06951         | Chromium            | 7440-47-3    | 50.8         | 0.871        | 2.22  |
| 06952         | Cobalt              | 7440-48-4    | 20.2         | 0.281        | 0.739 |
| 06953         | Copper              | 7440-50-8    | 103          | 0.325        | 1.48  |
| 01654         | Iron                | 7439-89-6    | 23,200       | 6.96         | 29.5  |
| 06955         | Lead                | 7439-92-1    | 281          | 0.886        | 2.22  |
| 01657         | Magnesium           | 7439-95-4    | 3,320        | 3.75         | 14.8  |
| 06958         | Manganese           | 7439-96-5    | 460          | 0.115        | 0.739 |
| 06961         | Nickel              | 7440-02-0    | 34.8         | 0.281        | 1.48  |
| 01662         | Potassium           | 7440-09-7    | 1,710        | 26.6         | 73.9  |
| 06936         | Selenium            | 7782-49-2    | 2.04 J       | 1.45         | 2.95  |
| 06966         | Silver              | 7440-22-4    | 0.496 J      | 0.266        | 0.739 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-44-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_24-26'

**LLI Sample #** SW 6262268  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

44-24

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01667                                                                                                                                                                 | Sodium        | 7440-23-5           | 167          | 55.1                        | 148                       | 1               |
| 06925                                                                                                                                                                 | Thallium      | 7440-28-0           | N.D.         | 2.14                        | 4.43                      | 1               |
| 06971                                                                                                                                                                 | Vanadium      | 7440-62-2           | 34.0         | 0.281                       | 0.739                     | 1               |
| 06972                                                                                                                                                                 | Zinc          | 7440-66-6           | 427          | 0.975                       | 2.95                      | 1               |
|                                                                                                                                                                       |               | <b>SW-846 7471A</b> | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6           | 0.752        | 0.0042                      | 0.145                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               | <b>SM20 2540 G</b>  | <b>%</b>     | <b>%</b>                    | <b>%</b>                  |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.                | 32.3         | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                     |              |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 09:08       | Stephanie A Selis | 70.49           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 11:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 11:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 11:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 20:14       | Brian K Graham    | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:53       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 02:53       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/28/2011 00:09       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-44-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-44-WC\_24-26'

LLI Sample # SW 6262268  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

44-24

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06958   | Manganese           | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06961   | Nickel              | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 01662   | Potassium           | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06936   | Selenium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06966   | Silver              | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 01667   | Sodium              | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06925   | Thallium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:47       | Damary Valentin  | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111115711001 | 04/22/2011 06:46       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

**Sample Description:** BH-10-45-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_0-2'

LLI Sample # SW 6262269  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

45-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 290          | 7                           | 21                        | 0.86            |
| 10950        | Benzene                     | 71-43-2             | 19           | 0.5                         | 5                         | 0.86            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | 2-Butanone                  | 78-93-3             | 40           | 4                           | 10                        | 0.86            |
| 10950        | Carbon Disulfide            | 75-15-0             | 4 J          | 1                           | 5                         | 0.86            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Cyclohexane                 | 110-82-7            | 2 J          | 1                           | 5                         | 0.86            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Ethylbenzene                | 100-41-4            | 17           | 1                           | 5                         | 0.86            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 10                        | 0.86            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 10                        | 0.86            |
| 10950        | Isopropylbenzene            | 98-82-8             | 5 J          | 1                           | 5                         | 0.86            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                         | 5                         | 0.86            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 10                        | 0.86            |
| 10950        | Methylcyclohexane           | 108-87-2            | 5 J          | 1                           | 5                         | 0.86            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Toluene                     | 108-88-3            | 41           | 1                           | 5                         | 0.86            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 5                         | 0.86            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 5                         | 0.86            |
| 10950        | Xylene (Total)              | 1330-20-7           | 74           | 1                           | 5                         | 0.86            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_0-2'

LLI Sample # SW 6262269  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

45-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 1,200                       | 4,000                     | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 2,000                       | 6,100                     | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 4,000                       | 12,000                    | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 810                         | 4,000                     | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 2,000                       | 6,100                     | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 810                         | 2,000                     | 10              |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-45-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_0-2'

**LLI Sample #** SW 6262269  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

45-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 2,000                       | 6,100                     | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 400                         | 2,000                     | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 2,000                       | 6,100                     | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 400                         | 2,000                     | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 810                         | 2,000                     | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 400                         | 2,000                     | 10              |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 11,200       | 5.83         | 23.2  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.16         | 2.32  |
| 06935         | Arsenic             | 7440-38-2    | 6.94         | 1.10         | 2.32  |
| 06946         | Barium              | 7440-39-3    | 75.7         | 0.0463       | 0.579 |
| 06947         | Beryllium           | 7440-41-7    | 0.523 J      | 0.0788       | 0.579 |
| 06949         | Cadmium             | 7440-43-9    | N.D.         | 0.162        | 0.579 |
| 01650         | Calcium             | 7440-70-2    | 37,300       | 7.10         | 23.2  |
| 06951         | Chromium            | 7440-47-3    | 32.3         | 0.684        | 1.74  |
| 06952         | Cobalt              | 7440-48-4    | 8.02         | 0.220        | 0.579 |
| 06953         | Copper              | 7440-50-8    | 48.8         | 0.255        | 1.16  |
| 01654         | Iron                | 7439-89-6    | 14,700       | 5.46         | 23.2  |
| 06955         | Lead                | 7439-92-1    | 96.7         | 0.695        | 1.74  |
| 01657         | Magnesium           | 7439-95-4    | 22,200       | 2.94         | 11.6  |
| 06958         | Manganese           | 7439-96-5    | 396          | 0.0904       | 0.579 |
| 06961         | Nickel              | 7440-02-0    | 16.1         | 0.220        | 1.16  |
| 01662         | Potassium           | 7440-09-7    | 904          | 20.9         | 57.9  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.14         | 2.32  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.209        | 0.579 |
| 01667         | Sodium              | 7440-23-5    | 61.2 J       | 43.2         | 116   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.68         | 3.48  |
| 06971         | Vanadium            | 7440-62-2    | 35.6         | 0.220        | 0.579 |
| 06972         | Zinc                | 7440-66-6    | 70.8         | 0.765        | 2.32  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_0-2'

**LLI Sample #** SW 6262269  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 12:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

45-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.267 | mg/kg<br>0.0033             | mg/kg<br>0.114            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>17.8      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X1111131AA   | 04/23/2011 07:02       | Stephanie A Selis | 0.86            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 12:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 12:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 12:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLA026  | 04/21/2011 20:39       | Brian K Graham    | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLA026  | 04/20/2011 15:40       | Kelli M Barto     | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111115708001 | 04/27/2011 03:05       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111115708001 | 04/27/2011 03:05       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111115708001 | 04/28/2011 00:12       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-45-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_0-2'

**LLI Sample #** SW 6262269  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 12:15 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

45-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin  | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111115708001 | 04/24/2011 11:50       | Damary Valentin  | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111115711001 | 04/22/2011 06:47       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111115708001 | 04/21/2011 12:14       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111115711001 | 04/21/2011 13:53       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002A | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_5-8'

LLI Sample # SW 6262270  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

45-58

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 530                         | 1,500                     | 61.23           |
| 10950        | Benzene                     | 71-43-2             | 890          | 38                          | 380                       | 61.23           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 310                         | 760                       | 61.23           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | Cyclohexane                 | 110-82-7            | 2,100        | 76                          | 380                       | 61.23           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Ethylbenzene                | 100-41-4            | 5,900        | 76                          | 380                       | 61.23           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 150                         | 760                       | 61.23           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 230                         | 760                       | 61.23           |
| 10950        | Isopropylbenzene            | 98-82-8             | 3,900        | 76                          | 380                       | 61.23           |
| 10950        | Methyl Acetate              | 79-20-9             | 260          | J 150                       | 380                       | 61.23           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 38                          | 380                       | 61.23           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 230                         | 760                       | 61.23           |
| 10950        | Methylcyclohexane           | 108-87-2            | 12,000       | 76                          | 380                       | 61.23           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Toluene                     | 108-88-3            | 360          | J 76                        | 380                       | 61.23           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 150                         | 380                       | 61.23           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 76                          | 380                       | 61.23           |
| 10950        | Xylene (Total)              | 1330-20-7           | 11,000       | 76                          | 380                       | 61.23           |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-45-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_5-8'

LLI Sample # SW 6262270  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

45-58

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 5,700        | J 2,100                     | 10,000                    | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Anthracene                   | 120-12-7            | 2,500        | J 2,100                     | 10,000                    | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 3,400        | J 2,100                     | 10,000                    | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 6,400        | J 2,100                     | 10,000                    | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Chrysene                     | 218-01-9            | 15,000       | 2,100                       | 10,000                    | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 6,200                       | 21,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 10,000                      | 31,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 21,000                      | 62,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 4,100                       | 21,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Fluorene                     | 86-73-7             | 8,600        | J 2,100                     | 10,000                    | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 10,000                      | 31,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 110,000      | 2,100                       | 10,000                    | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 4,100                       | 10,000                    | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_5-8'

LLI Sample # SW 6262270  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 12:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

45-58

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 27,000       | 2,100                       | 10,000                    | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 10,000                      | 31,000                    | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | 15,000       | 2,100                       | 10,000                    | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 10,000                      | 31,000                    | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 23,000       | 2,100                       | 10,000                    | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,100                       | 10,000                    | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 4,700        | J 2,100                     | 10,000                    | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 4,100                       | 10,000                    | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,100                       | 10,000                    | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 12,000       | 6.09                        | 24.2                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.21                        | 2.42                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 10.7         | 1.15                        | 2.42                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 122          | 0.0484                      | 0.605                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.551        | J 0.0823                    | 0.605                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.169                       | 0.605                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 20,900       | 7.42                        | 24.2                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 160          | 0.714                       | 1.82                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 10.0         | 0.230                       | 0.605                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 80.3         | 0.266                       | 1.21                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 26,600       | 5.70                        | 24.2                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 307          | 0.726                       | 1.82                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 8,680        | 3.07                        | 12.1                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 434          | 0.0944                      | 0.605                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 34.1         | 0.230                       | 1.21                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,490        | 21.8                        | 60.5                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.19                        | 2.42                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.218                       | 0.605                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 114          | J 45.2                      | 121                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | 4.31         | 1.76                        | 3.63                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 76.5         | 0.230                       | 0.605                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 229          | 0.799                       | 2.42                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_5-8'

**LLI Sample #** SW 6262270  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 12:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

45-58

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.667 | mg/kg<br>0.0034             | mg/kg<br>0.119            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>19.8      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 09:32       | Stephanie A Selis | 61.23           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 12:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 12:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 12:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 04:10       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-45-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_5-8'

**LLI Sample #** SW 6262270  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 12:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

45-58

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II     | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:04       | John W Yanzuk II     | 1               |
| 00159   | Mercury             | SW-846 7471A          | 2      | 111155711002 | 04/26/2011 08:10       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708002 | 04/22/2011 20:18       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711002 | 04/22/2011 23:30       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 2      | 111155711002 | 04/26/2011 01:05       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-45-WC\_18-20' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_18-20'

**LLI Sample #** SW 6262271  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

18-45

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 720                         | 2,000                     | 70.37           |
| 10950        | Benzene                     | 71-43-2             | 1,200        | 51                          | 510                       | 70.37           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 410                         | 1,000                     | 70.37           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | Cyclohexane                 | 110-82-7            | 2,000        | 100                         | 510                       | 70.37           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Ethylbenzene                | 100-41-4            | 520          | 100                         | 510                       | 70.37           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 200                         | 1,000                     | 70.37           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 310                         | 1,000                     | 70.37           |
| 10950        | Isopropylbenzene            | 98-82-8             | 6,400        | 100                         | 510                       | 70.37           |
| 10950        | Methyl Acetate              | 79-20-9             | 480          | J 200                       | 510                       | 70.37           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 51                          | 510                       | 70.37           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 310                         | 1,000                     | 70.37           |
| 10950        | Methylcyclohexane           | 108-87-2            | 11,000       | 100                         | 510                       | 70.37           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Toluene                     | 108-88-3            | 310          | J 100                       | 510                       | 70.37           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 200                         | 510                       | 70.37           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 100                         | 510                       | 70.37           |
| 10950        | Xylene (Total)              | 1330-20-7           | 2,600        | 100                         | 510                       | 70.37           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_18-20' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_18-20'

**LLI Sample #** SW 6262271  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

18-45

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 4,900        | 240                         | 1,200                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 2,800        | 240                         | 1,200                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 2,800        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 2,200        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 2,600        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 1,200        | J 240                       | 1,200                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 900          | J 240                       | 1,200                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 630          | J 240                       | 1,200                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | 510          | J 240                       | 1,200                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 3,700        | 240                         | 1,200                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 430          | J 240                       | 1,200                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 3,500        | 240                         | 1,200                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 720                         | 2,400                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,200                       | 3,600                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,400                       | 7,200                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 2,100        | J 480                       | 2,400                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 4,600        | 240                         | 1,200                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 6,100        | 240                         | 1,200                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,200                       | 3,600                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,000        | J 240                       | 1,200                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 25,000       | 240                         | 1,200                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 480                         | 1,200                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 480                         | 1,200                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_18-20' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_18-20'

**LLI Sample #** SW 6262271  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 13:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

18-45

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 9,000        | 240                         | 1,200                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 480                         | 1,200                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 480                         | 1,200                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,200                       | 3,600                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 240                         | 1,200                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 480                         | 1,200                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,200                       | 3,600                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 20,000       | 240                         | 1,200                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 4,600        | 240                         | 1,200                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 480                         | 1,200                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 240                         | 1,200                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 21,500       | 7.32                        | 29.1                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.46                        | 2.91                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 6.88         | 1.38                        | 2.91                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 224          | 0.0582                      | 0.728                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.19         | 0.0990                      | 0.728                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.204                       | 0.728                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 4,740        | 8.92                        | 29.1                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 46.6         | 0.859                       | 2.18                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 13.1         | 0.277                       | 0.728                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 52.7         | 0.320                       | 1.46                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 25,200       | 6.86                        | 29.1                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 159          | 0.873                       | 2.18                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 6,760        | 3.70                        | 14.6                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 449          | 0.114                       | 0.728                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 30.6         | 0.277                       | 1.46                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 2,050        | 26.2                        | 72.8                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | 1.60 J       | 1.43                        | 2.91                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.262                       | 0.728                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 300          | 54.3                        | 146                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | 3.53 J       | 2.11                        | 4.37                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 52.3         | 0.277                       | 0.728                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 204          | 0.961                       | 2.91                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-45-WC\_18-20' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_18-20'

**LLI Sample #** SW 6262271  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

18-45

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.669 | mg/kg<br>0.0041             | mg/kg<br>0.144            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>31.3      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 07:13       | Stephanie A Selis | 70.37           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 13:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 13:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 13:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 05:27       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-45-WC\_18-20' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-45-WC\_18-20'

**LLI Sample #** SW 6262271  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

18-45

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II     | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:08       | John W Yanzuk II     | 1               |
| 00159   | Mercury             | SW-846 7471A          | 2      | 111155711002 | 04/26/2011 08:11       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708002 | 04/22/2011 20:18       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711002 | 04/22/2011 23:30       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 2      | 111155711002 | 04/26/2011 01:05       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-55-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_0-2'

LLI Sample # SW 6262272  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 93           | 9                           | 25                        | 0.98            |
| 10950        | Benzene                     | 71-43-2             | 35           | 0.6                         | 6                         | 0.98            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | 2-Butanone                  | 78-93-3             | 11 J         | 5                           | 13                        | 0.98            |
| 10950        | Carbon Disulfide            | 75-15-0             | 4 J          | 1                           | 6                         | 0.98            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Cyclohexane                 | 110-82-7            | 3 J          | 1                           | 6                         | 0.98            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Ethylbenzene                | 100-41-4            | 7            | 1                           | 6                         | 0.98            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 3                           | 13                        | 0.98            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 13                        | 0.98            |
| 10950        | Isopropylbenzene            | 98-82-8             | 3 J          | 1                           | 6                         | 0.98            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                         | 6                         | 0.98            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 13                        | 0.98            |
| 10950        | Methylcyclohexane           | 108-87-2            | 8            | 1                           | 6                         | 0.98            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Toluene                     | 108-88-3            | 26           | 1                           | 6                         | 0.98            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 3                           | 6                         | 0.98            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 6                         | 0.98            |
| 10950        | Xylene (Total)              | 1330-20-7           | 34           | 1                           | 6                         | 0.98            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_0-2'

**LLI Sample #** SW 6262272  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

55-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 250 J        | 210                         | 1,100                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 680 J        | 210                         | 1,100                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 820 J        | 210                         | 1,100                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 1,200        | 210                         | 1,100                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 990 J        | 210                         | 1,100                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 400 J        | 210                         | 1,100                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 850 J        | 210                         | 1,100                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 290 J        | 210                         | 1,100                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 630                         | 2,100                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,100                       | 3,200                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,100                       | 6,300                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 460 J        | 420                         | 2,100                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 940 J        | 210                         | 1,100                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,100                       | 3,200                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 660 J        | 210                         | 1,100                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 210                         | 1,100                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 920 J        | 210                         | 1,100                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 420                         | 1,100                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 420                         | 1,100                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_0-2'

**LLI Sample #** SW 6262272  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 560 J        | 210                         | 1,100                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 210                         | 1,100                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 420                         | 1,100                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 420                         | 1,100                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 210                         | 1,100                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 210                         | 1,100                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,100                       | 3,200                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 210                         | 1,100                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 210                         | 1,100                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 420                         | 1,100                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,100                       | 3,200                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 870 J        | 210                         | 1,100                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 210                         | 1,100                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 900 J        | 210                         | 1,100                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 420                         | 1,100                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 210                         | 1,100                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 12,500       | 6.25                        | 24.9                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.24                        | 2.49                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 17.1         | 1.18                        | 2.49                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 108          | 0.0497                      | 0.622                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.645        | 0.0845                      | 0.622                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 0.557 J      | 0.174                       | 0.622                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 71,000       | 38.1                        | 124                       | 5               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 254          | 0.733                       | 1.86                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 7.77         | 0.236                       | 0.622                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 545          | 0.273                       | 1.24                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 21,300       | 5.86                        | 24.9                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 953          | 0.746                       | 1.86                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 32,500       | 3.16                        | 12.4                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 479          | 0.0970                      | 0.622                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 39.1         | 0.236                       | 1.24                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,040        | 22.4                        | 62.2                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | 1.57 J       | 1.22                        | 2.49                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | 0.286 J      | 0.224                       | 0.622                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 142          | 46.4                        | 124                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | 5.11         | 1.80                        | 3.73                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 100          | 0.236                       | 0.622                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 427          | 0.820                       | 2.49                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-55-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_0-2'

**LLI Sample #** SW 6262272  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

55-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | mg/kg      | mg/kg                       | mg/kg                     |                 |
|                                                                                                                                                                       |               |            | 2.32       | 0.0177                      | 0.618                     | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | %          | %                           | %                         |                 |
|                                                                                                                                                                       |               |            | 21.9       | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 07:25       | Stephanie A Selis | 0.98            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 14:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 05:53       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708002 | 04/27/2011 21:09       | John P Hook       | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_0-2'

**LLI Sample #** SW 6262272  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

55-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II     | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:12       | John W Yanzuk II     | 1               |
| 00159   | Mercury             | SW-846 7471A          | 2      | 111155711002 | 04/26/2011 09:54       | Damary Valentin      | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708002 | 04/22/2011 20:18       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711002 | 04/22/2011 23:30       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 2      | 111155711002 | 04/26/2011 01:05       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-55-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_5-8'

LLI Sample # SW 6262273  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-58

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 770                         | 2,200                     | 66.54           |
| 10950        | Benzene                     | 71-43-2             | N.D.         | 55                          | 550                       | 66.54           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 440                         | 1,100                     | 66.54           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Cyclohexane                 | 110-82-7            | 210 J        | 110                         | 550                       | 66.54           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Ethylbenzene                | 100-41-4            | 390 J        | 110                         | 550                       | 66.54           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 220                         | 1,100                     | 66.54           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 330                         | 1,100                     | 66.54           |
| 10950        | Isopropylbenzene            | 98-82-8             | 530 J        | 110                         | 550                       | 66.54           |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 55                          | 550                       | 66.54           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 330                         | 1,100                     | 66.54           |
| 10950        | Methylcyclohexane           | 108-87-2            | 2,300        | 110                         | 550                       | 66.54           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 220                         | 550                       | 66.54           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 110                         | 550                       | 66.54           |
| 10950        | Xylene (Total)              | 1330-20-7           | 2,700        | 110                         | 550                       | 66.54           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_5-8'

LLI Sample # SW 6262273  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-58

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 1,600        | 270                         | 1,400                     | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Anthracene                   | 120-12-7            | 450 J        | 270                         | 1,400                     | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 340 J        | 270                         | 1,400                     | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 1,600        | 270                         | 1,400                     | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Chrysene                     | 218-01-9            | 670 J        | 270                         | 1,400                     | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 820                         | 2,700                     | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,400                       | 4,100                     | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,700                       | 8,200                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 540                         | 2,700                     | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 330 J        | 270                         | 1,400                     | 1               |
| 10727        | Fluorene                     | 86-73-7             | 1,500        | 270                         | 1,400                     | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,400                       | 4,100                     | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 18,000       | 270                         | 1,400                     | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 540                         | 1,400                     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-55-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_5-8'

**LLI Sample #** SW 6262273  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 14:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-58

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 2,500        | 270                         | 1,400                     | 1               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,400                       | 4,100                     | 1               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 270                         | 1,400                     | 1               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,400                       | 4,100                     | 1               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 5,600        | 270                         | 1,400                     | 1               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 270                         | 1,400                     | 1               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 720 J        | 270                         | 1,400                     | 1               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 540                         | 1,400                     | 1               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 270                         | 1,400                     | 1               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

| Metals                                                                   |           | SW-846 6010B | mg/kg   | mg/kg  | mg/kg |   |
|--------------------------------------------------------------------------|-----------|--------------|---------|--------|-------|---|
| 01643                                                                    | Aluminum  | 7429-90-5    | 14,000  | 8.22   | 32.7  | 1 |
| 06944                                                                    | Antimony  | 7440-36-0    | N.D.    | 8.17   | 16.3  | 5 |
| Reporting limits were raised due to interference from the sample matrix. |           |              |         |        |       |   |
| 06935                                                                    | Arsenic   | 7440-38-2    | 12.7    | 1.55   | 3.27  | 1 |
| 06946                                                                    | Barium    | 7440-39-3    | 88.8    | 0.0654 | 0.817 | 1 |
| 06947                                                                    | Beryllium | 7440-41-7    | 0.425 J | 0.111  | 0.817 | 1 |
| 06949                                                                    | Cadmium   | 7440-43-9    | 0.422 J | 0.229  | 0.817 | 1 |
| 01650                                                                    | Calcium   | 7440-70-2    | 152,000 | 50.1   | 163   | 5 |
| 06951                                                                    | Chromium  | 7440-47-3    | 475     | 0.964  | 2.45  | 1 |
| 06952                                                                    | Cobalt    | 7440-48-4    | 6.24    | 0.310  | 0.817 | 1 |
| 06953                                                                    | Copper    | 7440-50-8    | 120     | 0.359  | 1.63  | 1 |
| 01654                                                                    | Iron      | 7439-89-6    | 11,300  | 7.70   | 32.7  | 1 |
| 06955                                                                    | Lead      | 7439-92-1    | 316     | 0.980  | 2.45  | 1 |
| 01657                                                                    | Magnesium | 7439-95-4    | 116,000 | 20.7   | 81.7  | 5 |
| 06958                                                                    | Manganese | 7439-96-5    | 617     | 0.127  | 0.817 | 1 |
| 06961                                                                    | Nickel    | 7440-02-0    | 38.4    | 0.310  | 1.63  | 1 |
| 01662                                                                    | Potassium | 7440-09-7    | 496     | 29.4   | 81.7  | 1 |
| 06936                                                                    | Selenium  | 7782-49-2    | 1.68 J  | 1.60   | 3.27  | 1 |
| 06966                                                                    | Silver    | 7440-22-4    | N.D.    | 0.294  | 0.817 | 1 |
| 01667                                                                    | Sodium    | 7440-23-5    | 85.4 J  | 60.9   | 163   | 1 |
| 06925                                                                    | Thallium  | 7440-28-0    | 3.30 J  | 2.37   | 4.90  | 1 |
| 06971                                                                    | Vanadium  | 7440-62-2    | 71.7    | 0.310  | 0.817 | 1 |
| 06972                                                                    | Zinc      | 7440-66-6    | 641     | 1.08   | 3.27  | 1 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_5-8'

**LLI Sample #** SW 6262273  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 14:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

55-58

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | 0.116 J    | 0.0045                      | 0.157                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | 39.4       | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 09:54       | Stephanie A Selis | 66.54           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 14:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 14:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 14:45       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 06:18       | Brian K Graham    | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708002 | 04/27/2011 21:12       | John P Hook       | 5               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708002 | 04/27/2011 21:12       | John P Hook       | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708002 | 04/27/2011 21:12       | John P Hook       | 5               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_5-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_5-8'

**LLI Sample #** SW 6262273  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 14:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

55-58

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II     | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708002 | 04/26/2011 23:17       | John W Yanzuk II     | 1               |
| 00159   | Mercury             | SW-846 7471A          | 2      | 111155711002 | 04/26/2011 08:21       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708002 | 04/22/2011 20:18       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711002 | 04/22/2011 23:30       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 2      | 111155711002 | 04/26/2011 01:05       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-55-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_20-22'

**LLI Sample #** SW 6262274  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-20

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 670                         | 1,900                     | 64.67           |
| 10950        | Benzene                     | 71-43-2             | 120 J        | 48                          | 480                       | 64.67           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 380                         | 960                       | 64.67           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Cyclohexane                 | 110-82-7            | 460 J        | 96                          | 480                       | 64.67           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Ethylbenzene                | 100-41-4            | 140 J        | 96                          | 480                       | 64.67           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 190                         | 960                       | 64.67           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 290                         | 960                       | 64.67           |
| 10950        | Isopropylbenzene            | 98-82-8             | 290 J        | 96                          | 480                       | 64.67           |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 48                          | 480                       | 64.67           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 290                         | 960                       | 64.67           |
| 10950        | Methylcyclohexane           | 108-87-2            | 4,300        | 96                          | 480                       | 64.67           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Toluene                     | 108-88-3            | 1,100        | 96                          | 480                       | 64.67           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 190                         | 480                       | 64.67           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 96                          | 480                       | 64.67           |
| 10950        | Xylene (Total)              | 1330-20-7           | 400 J        | 96                          | 480                       | 64.67           |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-55-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_20-22'

**LLI Sample #** SW 6262274  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

55-20

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 8,700        | 240                         | 1,200                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | 2,100        | 240                         | 1,200                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 5,900        | 240                         | 1,200                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 7,100        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 6,000        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 6,900        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 3,100        | 240                         | 1,200                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 3,300        | 240                         | 1,200                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 1,700        | 240                         | 1,200                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | 820          | J 240                       | 1,200                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 7,100        | 240                         | 1,200                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 1,100        | J 240                       | 1,200                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 3,700        | 240                         | 1,200                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 730                         | 2,400                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | 630          | J 490                       | 1,200                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,400                       | 7,300                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 1,500        | J 490                       | 2,400                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 15,000       | 240                         | 1,200                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 6,800        | 240                         | 1,200                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 2,900        | 240                         | 1,200                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 240                         | 1,200                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 12,000       | 240                         | 1,200                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 490                         | 1,200                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | 6,700        | 490                         | 1,200                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_20-22'

**LLI Sample #** SW 6262274  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 15:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

55-20

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 27,000       | 240                         | 1,200                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 490                         | 1,200                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 490                         | 1,200                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 240                         | 1,200                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 240                         | 1,200                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 490                         | 1,200                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 24,000       | 240                         | 1,200                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | 270          | J 240                       | 1,200                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 15,000       | 240                         | 1,200                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 490                         | 1,200                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 240                         | 1,200                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 12,800       | 7.15                        | 28.4                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.42                        | 2.84                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 12.3         | 1.35                        | 2.84                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 345          | 0.0569                      | 0.711                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.45         | 0.0967                      | 0.711                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 1.56         | 0.199                       | 0.711                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 4,830        | 8.72                        | 28.4                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 47.7         | 0.839                       | 2.13                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 17.9         | 0.270                       | 0.711                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 97.4         | 0.313                       | 1.42                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 21,200       | 6.70                        | 28.4                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 304          | 0.853                       | 2.13                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 3,140        | 3.61                        | 14.2                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 369          | 0.111                       | 0.711                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 32.8         | 0.270                       | 1.42                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,450        | 25.6                        | 71.1                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | 2.76         | J 1.39                      | 2.84                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | 0.583        | J 0.256                     | 0.711                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 215          | 53.1                        | 142                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 2.06                        | 4.27                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 30.3         | 0.270                       | 0.711                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 399          | 0.939                       | 2.84                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_20-22'

**LLI Sample #** SW 6262274  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

55-20

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.735 | mg/kg<br>0.0041             | mg/kg<br>0.144            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>32.4      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 10:17       | Stephanie A Selis | 64.67           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 15:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 06:44       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708002 | 04/26/2011 23:21       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-55-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-55-WC\_20-22'

**LLI Sample #** SW 6262274  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

55-20

## Laboratory Sample Analysis Record

| CAT<br>No. | Analysis Name       | Method                   | Trial# | Batch#       | Analysis   |       | Analyst                 | Dilution |
|------------|---------------------|--------------------------|--------|--------------|------------|-------|-------------------------|----------|
|            |                     |                          |        |              | Date       | Time  |                         |          |
| 06971      | Vanadium            | SW-846 6010B             | 1      | 111125708002 | 04/26/2011 | 23:21 | John W Yanzuk II        | 1        |
| 06972      | Zinc                | SW-846 6010B             | 1      | 111125708002 | 04/26/2011 | 23:21 | John W Yanzuk II        | 1        |
| 00159      | Mercury             | SW-846 7471A             | 2      | 111155711002 | 04/26/2011 | 08:22 | Damary Valentin         | 1        |
| 05708      | SW SW846 ICP Digest | SW-846 3050B             | 1      | 111125708002 | 04/22/2011 | 20:18 | Annamaria<br>Stipkovits | 1        |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 1      | 111125711002 | 04/22/2011 | 23:30 | Annamaria<br>Stipkovits | 1        |
| 05711      | SW SW846 Hg Digest  | SW-846 7471A<br>modified | 2      | 111155711002 | 04/26/2011 | 01:05 | Annamaria<br>Stipkovits | 1        |
| 00111      | Moisture            | SM20 2540 G              | 1      | 11112820002B | 04/22/2011 | 18:41 | Scott W Freisher        | 1        |



**Sample Description:** BH-10-56-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_0-2'

LLI Sample # SW 6262275  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

56-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 30           | 8                           | 24                        | 1.02            |
| 10950        | Benzene                     | 71-43-2             | 16           | 0.6                         | 6                         | 1.02            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 5                           | 12                        | 1.02            |
| 10950        | Carbon Disulfide            | 75-15-0             | 2 J          | 1                           | 6                         | 1.02            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Cyclohexane                 | 110-82-7            | 1 J          | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Ethylbenzene                | 100-41-4            | 3 J          | 1                           | 6                         | 1.02            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 12                        | 1.02            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 12                        | 1.02            |
| 10950        | Isopropylbenzene            | 98-82-8             | 1 J          | 1                           | 6                         | 1.02            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                         | 6                         | 1.02            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 12                        | 1.02            |
| 10950        | Methylcyclohexane           | 108-87-2            | 4 J          | 1                           | 6                         | 1.02            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Tetrachloroethene           | 127-18-4            | 2 J          | 1                           | 6                         | 1.02            |
| 10950        | Toluene                     | 108-88-3            | 9            | 1                           | 6                         | 1.02            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 6                         | 1.02            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 6                         | 1.02            |
| 10950        | Xylene (Total)              | 1330-20-7           | 17           | 1                           | 6                         | 1.02            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_0-2'

LLI Sample # SW 6262275  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

56-02

| CAT No. | Analysis Name                | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
|         | was confirmed.               |              |            |                             |                           |                 |
| GC/MS   | Semivolatiles                | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
| 10727   | Acenaphthene                 | 83-32-9      | N.D.       | 190                         | 970                       | 5               |
| 10727   | Acenaphthylene               | 208-96-8     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Acetophenone                 | 98-86-2      | N.D.       | 390                         | 970                       | 5               |
| 10727   | Anthracene                   | 120-12-7     | 250        | 190                         | 970                       | 5               |
| 10727   | Atrazine                     | 1912-24-9    | N.D.       | 190                         | 970                       | 5               |
| 10727   | Benzaldehyde                 | 100-52-7     | N.D.       | 390                         | 970                       | 5               |
| 10727   | Benzo(a)anthracene           | 56-55-3      | 1,200      | 190                         | 970                       | 5               |
| 10727   | Benzo(a)pyrene               | 50-32-8      | 1,600      | 190                         | 970                       | 5               |
| 10727   | Benzo(b)fluoranthene         | 205-99-2     | 2,100      | 190                         | 970                       | 5               |
| 10727   | Benzo(g,h,i)perylene         | 191-24-2     | 1,500      | 190                         | 970                       | 5               |
| 10727   | Benzo(k)fluoranthene         | 207-08-9     | 760        | 190                         | 970                       | 5               |
| 10727   | 1,1'-Biphenyl                | 92-52-4      | N.D.       | 190                         | 970                       | 5               |
| 10727   | 4-Bromophenyl-phenylether    | 101-55-3     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Butylbenzylphthalate         | 85-68-7      | N.D.       | 390                         | 970                       | 5               |
| 10727   | Di-n-butylphthalate          | 84-74-2      | N.D.       | 390                         | 970                       | 5               |
| 10727   | Caprolactam                  | 105-60-2     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Carbazole                    | 86-74-8      | N.D.       | 190                         | 970                       | 5               |
| 10727   | 4-Chloro-3-methylphenol      | 59-50-7      | N.D.       | 390                         | 970                       | 5               |
| 10727   | 4-Chloroaniline              | 106-47-8     | N.D.       | 390                         | 970                       | 5               |
| 10727   | bis(2-Chloroethoxy)methane   | 111-91-1     | N.D.       | 190                         | 970                       | 5               |
| 10727   | bis(2-Chloroethyl)ether      | 111-44-4     | N.D.       | 190                         | 970                       | 5               |
| 10727   | 2-Chloronaphthalene          | 91-58-7      | N.D.       | 190                         | 970                       | 5               |
| 10727   | 2-Chlorophenol               | 95-57-8      | N.D.       | 190                         | 970                       | 5               |
| 10727   | 4-Chlorophenyl-phenylether   | 7005-72-3    | N.D.       | 190                         | 970                       | 5               |
| 10727   | 2,2'-oxybis(1-Chloropropane) | 108-60-1     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Chrysene                     | 218-01-9     | 1,300      | 190                         | 970                       | 5               |
| 10727   | Dibenz(a,h)anthracene        | 53-70-3      | 520        | 190                         | 970                       | 5               |
| 10727   | Dibenzofuran                 | 132-64-9     | N.D.       | 190                         | 970                       | 5               |
| 10727   | 3,3'-Dichlorobenzidine       | 91-94-1      | N.D.       | 580                         | 1,900                     | 5               |
| 10727   | 2,4-Dichlorophenol           | 120-83-2     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Diethylphthalate             | 84-66-2      | N.D.       | 390                         | 970                       | 5               |
| 10727   | 2,4-Dimethylphenol           | 105-67-9     | N.D.       | 390                         | 970                       | 5               |
| 10727   | Dimethylphthalate            | 131-11-3     | N.D.       | 390                         | 970                       | 5               |
| 10727   | 4,6-Dinitro-2-methylphenol   | 534-52-1     | N.D.       | 970                         | 2,900                     | 5               |
| 10727   | 2,4-Dinitrophenol            | 51-28-5      | N.D.       | 1,900                       | 5,800                     | 5               |
| 10727   | 2,4-Dinitrotoluene           | 121-14-2     | N.D.       | 390                         | 970                       | 5               |
| 10727   | 2,6-Dinitrotoluene           | 606-20-2     | N.D.       | 190                         | 970                       | 5               |
| 10727   | bis(2-Ethylhexyl)phthalate   | 117-81-7     | N.D.       | 390                         | 1,900                     | 5               |
| 10727   | Fluoranthene                 | 206-44-0     | 1,500      | 190                         | 970                       | 5               |
| 10727   | Fluorene                     | 86-73-7      | N.D.       | 190                         | 970                       | 5               |
| 10727   | Hexachlorobenzene            | 118-74-1     | N.D.       | 190                         | 970                       | 5               |
| 10727   | Hexachlorobutadiene          | 87-68-3      | N.D.       | 390                         | 970                       | 5               |
| 10727   | Hexachlorocyclopentadiene    | 77-47-4      | N.D.       | 970                         | 2,900                     | 5               |
| 10727   | Hexachloroethane             | 67-72-1      | N.D.       | 190                         | 970                       | 5               |
| 10727   | Indeno(1,2,3-cd)pyrene       | 193-39-5     | 1,100      | 190                         | 970                       | 5               |
| 10727   | Isophorone                   | 78-59-1      | N.D.       | 190                         | 970                       | 5               |
| 10727   | 2-Methylnaphthalene          | 91-57-6      | 520        | 190                         | 970                       | 5               |
| 10727   | 2-Methylphenol               | 95-48-7      | N.D.       | 390                         | 970                       | 5               |
| 10727   | 4-Methylphenol               | 106-44-5     | N.D.       | 390                         | 970                       | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_0-2'

**LLI Sample #** SW 6262275  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

56-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 450 J        | 190                         | 970                       | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 390                         | 970                       | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 390                         | 970                       | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 970                         | 2,900                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 190                         | 970                       | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 190                         | 970                       | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 390                         | 970                       | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 970                         | 2,900                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 930 J        | 190                         | 970                       | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 1,400        | 190                         | 970                       | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 390                         | 970                       | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 190                         | 970                       | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 14,900       | 5.95         | 23.6  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.18         | 2.36  |
| 06935         | Arsenic             | 7440-38-2    | 9.44         | 1.12         | 2.36  |
| 06946         | Barium              | 7440-39-3    | 100          | 0.0473       | 0.591 |
| 06947         | Beryllium           | 7440-41-7    | 0.796        | 0.0804       | 0.591 |
| 06949         | Cadmium             | 7440-43-9    | N.D.         | 0.165        | 0.591 |
| 01650         | Calcium             | 7440-70-2    | 18,400       | 7.25         | 23.6  |
| 06951         | Chromium            | 7440-47-3    | 93.1         | 0.697        | 1.77  |
| 06952         | Cobalt              | 7440-48-4    | 6.74         | 0.225        | 0.591 |
| 06953         | Copper              | 7440-50-8    | 58.8         | 0.260        | 1.18  |
| 01654         | Iron                | 7439-89-6    | 19,900       | 5.57         | 23.6  |
| 06955         | Lead                | 7439-92-1    | 86.4         | 0.709        | 1.77  |
| 01657         | Magnesium           | 7439-95-4    | 7,330        | 3.00         | 11.8  |
| 06958         | Manganese           | 7439-96-5    | 242          | 0.0922       | 0.591 |
| 06961         | Nickel              | 7440-02-0    | 23.5         | 0.225        | 1.18  |
| 01662         | Potassium           | 7440-09-7    | 1,540        | 21.3         | 59.1  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.16         | 2.36  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.213        | 0.591 |
| 01667         | Sodium              | 7440-23-5    | 142          | 44.1         | 118   |
| 06925         | Thallium            | 7440-28-0    | 3.51 J       | 1.71         | 3.55  |
| 06971         | Vanadium            | 7440-62-2    | 58.6         | 0.225        | 0.591 |
| 06972         | Zinc                | 7440-66-6    | 106          | 0.780        | 2.36  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_0-2'

**LLI Sample #** SW 6262275  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

56-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.153 | mg/kg<br>0.0032             | mg/kg<br>0.112            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>15.4      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 07:48       | Stephanie A Selis | 1.02            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 16:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 07:09       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-56-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_0-2'

**LLI Sample #** SW 6262275  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

56-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708006 | 04/27/2011 23:28       | John W Yanzuk II | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711006 | 04/26/2011 08:27       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708006 | 04/25/2011 09:10       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711006 | 04/25/2011 10:10       | Denise K Conners | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher | 1               |

**Sample Description:** BH-10-56-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_10-12'

LLI Sample # SW 6262276  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

56-10

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 650                         | 1,900                     | 62.71           |
| 10950        | Benzene                     | 71-43-2             | 11,000       | 46                          | 460                       | 62.71           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 370                         | 930                       | 62.71           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | Cyclohexane                 | 110-82-7            | 590          | 93                          | 460                       | 62.71           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Ethylbenzene                | 100-41-4            | 2,500        | 93                          | 460                       | 62.71           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 190                         | 930                       | 62.71           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 280                         | 930                       | 62.71           |
| 10950        | Isopropylbenzene            | 98-82-8             | 1,200        | 93                          | 460                       | 62.71           |
| 10950        | Methyl Acetate              | 79-20-9             | 670          | 190                         | 460                       | 62.71           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 46                          | 460                       | 62.71           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 280                         | 930                       | 62.71           |
| 10950        | Methylcyclohexane           | 108-87-2            | 1,500        | 93                          | 460                       | 62.71           |
| 10950        | Methylene Chloride          | 75-09-2             | 500          | 190                         | 460                       | 62.71           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Tetrachloroethene           | 127-18-4            | 520          | 93                          | 460                       | 62.71           |
| 10950        | Toluene                     | 108-88-3            | 11,000       | 93                          | 460                       | 62.71           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Trichloroethene             | 79-01-6             | 110 J        | 93                          | 460                       | 62.71           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 190                         | 460                       | 62.71           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 93                          | 460                       | 62.71           |
| 10950        | Xylene (Total)              | 1330-20-7           | 13,000       | 93                          | 460                       | 62.71           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_10-12'

**LLI Sample #** SW 6262276  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

56-10

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 2,200        | J 1,200                     | 6,100                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 1,500        | J 1,200                     | 6,100                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 3,300        | J 1,200                     | 6,100                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 3,100        | J 1,200                     | 6,100                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 2,600        | J 1,200                     | 6,100                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 3,300        | J 1,200                     | 6,100                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 5,700        | J 1,200                     | 6,100                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 1,800        | J 1,200                     | 6,100                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 3,700                       | 12,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 6,100                       | 18,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 12,000                      | 37,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 2,300        | J 1,200                     | 6,100                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 2,700        | J 1,200                     | 6,100                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 6,100                       | 18,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,400        | J 1,200                     | 6,100                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 15,000       | 1,200                       | 6,100                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 2,400                       | 6,100                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_10-12'

**LLI Sample #** SW 6262276  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 16:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

56-10

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 7,100        | 1,200                       | 6,100                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 6,100                       | 18,000                    | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 1,200                       | 6,100                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 6,100                       | 18,000                    | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 12,000       | 1,200                       | 6,100                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 1,200                       | 6,100                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 4,700        | J 1,200                     | 6,100                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 2,400                       | 6,100                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 1,200                       | 6,100                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 15,500       | 7.45                        | 29.6                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.48                        | 2.96                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 13.5         | 1.41                        | 2.96                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 178          | 0.0593                      | 0.741                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.640        | J 0.101                     | 0.741                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.207                       | 0.741                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 53,700       | 9.08                        | 29.6                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 282          | 0.874                       | 2.22                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 9.60         | 0.281                       | 0.741                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 163          | 0.326                       | 1.48                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 28,100       | 6.98                        | 29.6                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 676          | 0.889                       | 2.22                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 24,900       | 3.76                        | 14.8                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 675          | 0.116                       | 0.741                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 67.7         | 0.281                       | 1.48                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 2,010        | 26.7                        | 74.1                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.45                        | 2.96                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | 0.290        | J 0.267                     | 0.741                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 402          | 55.3                        | 148                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | 6.02         | 2.15                        | 4.44                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 120          | 0.281                       | 0.741                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 513          | 0.978                       | 2.96                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-56-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_10-12'

**LLI Sample #** SW 6262276  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 16:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

56-10

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>1.88 | mg/kg<br>0.0208             | mg/kg<br>0.727            | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>32.5     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 10:40       | Stephanie A Selis | 62.71           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 16:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 16:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 16:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 07:35       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II  | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-56-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_10-12'

**LLI Sample #** SW 6262276  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 16:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

56-10

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708006 | 04/27/2011 23:32       | John W Yanzuk II | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711006 | 04/26/2011 09:32       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708006 | 04/25/2011 09:10       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711006 | 04/25/2011 10:10       | Denise K Conners | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_22-24' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_22-24'

**LLI Sample #** SW 6262277  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 17:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

56-22

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 740                         | 2,100                     | 70.31           |
| 10950        | Benzene                     | 71-43-2             | 160 J        | 53                          | 530                       | 70.31           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 420                         | 1,100                     | 70.31           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Ethylbenzene                | 100-41-4            | 210 J        | 110                         | 530                       | 70.31           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 210                         | 1,100                     | 70.31           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 320                         | 1,100                     | 70.31           |
| 10950        | Isopropylbenzene            | 98-82-8             | 190 J        | 110                         | 530                       | 70.31           |
| 10950        | Methyl Acetate              | 79-20-9             | 320 J        | 210                         | 530                       | 70.31           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 53                          | 530                       | 70.31           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 320                         | 1,100                     | 70.31           |
| 10950        | Methylcyclohexane           | 108-87-2            | 520 J        | 110                         | 530                       | 70.31           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Toluene                     | 108-88-3            | 1,300        | 110                         | 530                       | 70.31           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 210                         | 530                       | 70.31           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 110                         | 530                       | 70.31           |
| 10950        | Xylene (Total)              | 1330-20-7           | 590          | 110                         | 530                       | 70.31           |

Reporting limits were raised due to interference from the sample matrix.

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_22-24' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_22-24'

**LLI Sample #** SW 6262277  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 17:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

56-22

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 7,300        | 250                         | 1,200                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | 1,700        | 250                         | 1,200                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 6,000        | 250                         | 1,200                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 5,300        | 250                         | 1,200                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 4,500        | 250                         | 1,200                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 5,300        | 250                         | 1,200                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 2,500        | 250                         | 1,200                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 1,900        | 250                         | 1,200                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 2,200        | 250                         | 1,200                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | 810          | J 250                       | 1,200                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 6,400        | 250                         | 1,200                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 850          | J 250                       | 1,200                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 3,300        | 250                         | 1,200                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 750                         | 2,500                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | 970          | J 500                       | 1,200                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,500                       | 7,500                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 580          | J 500                       | 2,500                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 12,000       | 250                         | 1,200                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 6,100        | 250                         | 1,200                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 2,100        | 250                         | 1,200                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 17,000       | 250                         | 1,200                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | 530          | J 500                       | 1,200                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | 7,200        | 500                         | 1,200                     | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-56-WC\_22-24' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_22-24'

**LLI Sample #** SW 6262277  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 17:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

56-22

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 34,000       | 2,500                       | 12,000                    | 50              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 250                         | 1,200                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 250                         | 1,200                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,200                       | 3,700                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 20,000       | 250                         | 1,200                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | 370 J        | 250                         | 1,200                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 13,000       | 250                         | 1,200                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 500                         | 1,200                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 250                         | 1,200                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 15,500       | 7.28         | 29.0  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.45         | 2.90  |
| 06935         | Arsenic             | 7440-38-2    | 18.0         | 1.38         | 2.90  |
| 06946         | Barium              | 7440-39-3    | 245          | 0.0579       | 0.724 |
| 06947         | Beryllium           | 7440-41-7    | 1.61         | 0.0985       | 0.724 |
| 06949         | Cadmium             | 7440-43-9    | 1.66         | 0.203        | 0.724 |
| 01650         | Calcium             | 7440-70-2    | 4,390        | 8.88         | 29.0  |
| 06951         | Chromium            | 7440-47-3    | 50.3         | 0.854        | 2.17  |
| 06952         | Cobalt              | 7440-48-4    | 19.7         | 0.275        | 0.724 |
| 06953         | Copper              | 7440-50-8    | 109          | 0.319        | 1.45  |
| 01654         | Iron                | 7439-89-6    | 23,300       | 6.82         | 29.0  |
| 06955         | Lead                | 7439-92-1    | 316          | 0.869        | 2.17  |
| 01657         | Magnesium           | 7439-95-4    | 3,580        | 3.68         | 14.5  |
| 06958         | Manganese           | 7439-96-5    | 424          | 0.113        | 0.724 |
| 06961         | Nickel              | 7440-02-0    | 35.6         | 0.275        | 1.45  |
| 01662         | Potassium           | 7440-09-7    | 1,720        | 26.1         | 72.4  |
| 06936         | Selenium            | 7782-49-2    | 3.57         | 1.42         | 2.90  |
| 06966         | Silver              | 7440-22-4    | 0.520 J      | 0.261        | 0.724 |
| 01667         | Sodium              | 7440-23-5    | 656          | 54.0         | 145   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 2.10         | 4.34  |
| 06971         | Vanadium            | 7440-62-2    | 31.1         | 0.275        | 0.724 |
| 06972         | Zinc                | 7440-66-6    | 457          | 0.956        | 2.90  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_22-24' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_22-24'

**LLI Sample #** SW 6262277  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/12/2011 17:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

56-22

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.906 | mg/kg<br>0.0041             | mg/kg<br>0.144            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>33.6      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 11:03       | Stephanie A Selis | 70.31           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/12/2011 17:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/12/2011 17:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/12/2011 17:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 08:00       | Brian K Graham    | 5               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 13:35       | Brian K Graham    | 50              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 08:37       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-56-WC\_22-24' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-56-WC\_22-24'

LLI Sample # SW 6262277  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/12/2011 17:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

56-22

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder    | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:29       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 09:56       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher | 1               |

**Sample Description:** BH-10-77-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_0-2'

LLI Sample # SW 6262278  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 82           | 6                           | 18                        | 0.74            |
| 10950        | Benzene                     | 71-43-2             | 2 J          | 0.4                         | 4                         | 0.74            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 2-Butanone                  | 78-93-3             | 8 J          | 4                           | 9                         | 0.74            |
| 10950        | Carbon Disulfide            | 75-15-0             | 1 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 9                         | 0.74            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.4                         | 4                         | 0.74            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Methylcyclohexane           | 108-87-2            | 0.9 J        | 0.9                         | 4                         | 0.74            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 0.9                         | 4                         | 0.74            |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-77-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_0-2'

LLI Sample # SW 6262278  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 270 J        | 200                         | 1,000                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 520 J        | 200                         | 1,000                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 2,000        | 200                         | 1,000                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 1,900        | 200                         | 1,000                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 2,500        | 200                         | 1,000                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 1,500        | 200                         | 1,000                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 1,100        | 200                         | 1,000                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | 380 J        | 200                         | 1,000                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 2,000        | 200                         | 1,000                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 530 J        | 200                         | 1,000                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 600                         | 2,000                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,000                       | 3,000                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,000                       | 6,000                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 400                         | 2,000                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 3,700        | 200                         | 1,000                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 220 J        | 200                         | 1,000                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,000                       | 3,000                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,300        | 200                         | 1,000                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 200                         | 1,000                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 230 J        | 200                         | 1,000                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 400                         | 1,000                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 400                         | 1,000                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_0-2'

**LLI Sample #** SW 6262278  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 240 J        | 200                         | 1,000                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 200                         | 1,000                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 400                         | 1,000                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 400                         | 1,000                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 200                         | 1,000                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 200                         | 1,000                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,000                       | 3,000                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 200                         | 1,000                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 200                         | 1,000                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 400                         | 1,000                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,000                       | 3,000                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 2,700        | 200                         | 1,000                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 3,200        | 200                         | 1,000                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 400                         | 1,000                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 200                         | 1,000                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 16,700       | 5.91                        | 23.5                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.17                        | 2.35                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 12.2         | 1.12                        | 2.35                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 128          | 0.0470                      | 0.587                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.780        | 0.0798                      | 0.587                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.164                       | 0.587                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 6,090        | 7.20                        | 23.5                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 37.0         | 0.693                       | 1.76                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 7.60         | 0.223                       | 0.587                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 160          | 0.258                       | 1.17                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 26,700       | 5.53                        | 23.5                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 225          | 0.704                       | 1.76                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 3,450        | 2.98                        | 11.7                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 214          | 0.0916                      | 0.587                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 26.1         | 0.223                       | 1.17                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,550        | 21.1                        | 58.7                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.15                        | 2.35                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.211                       | 0.587                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 83.3 J       | 43.8                        | 117                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.70                        | 3.52                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 50.2         | 0.223                       | 0.587                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 109          | 0.775                       | 2.35                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_0-2'

**LLI Sample #** SW 6262278  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

77-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.414 | mg/kg<br>0.0033             | mg/kg<br>0.116            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>17.3      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111151AA    | 04/25/2011 21:10       | Sara E Johnson    | 0.74            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 10:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 08:26       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 08:57       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-77-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_0-2'

**LLI Sample #** SW 6262278  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:50       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 09:57       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-77-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_10-12'

**LLI Sample #** SW 6262279  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

**Submitted:** 04/19/2011 14:50

**Reported:** 05/05/2011 14:47

77-12

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 8,300                       | 24,000                    | 725.69          |
| 10950        | Benzene                     | 71-43-2             | 2,400        | J 590                       | 5,900                     | 725.69          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 4,700                       | 12,000                    | 725.69          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Ethylbenzene                | 100-41-4            | 1,500        | J 1,200                     | 5,900                     | 725.69          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2,400                       | 12,000                    | 725.69          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3,500                       | 12,000                    | 725.69          |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 590                         | 5,900                     | 725.69          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | 6,200        | J 3,500                     | 12,000                    | 725.69          |
| 10950        | Methylcyclohexane           | 108-87-2            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Toluene                     | 108-88-3            | 3,200        | J 1,200                     | 5,900                     | 725.69          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2,400                       | 5,900                     | 725.69          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1,200                       | 5,900                     | 725.69          |
| 10950        | Xylene (Total)              | 1330-20-7           | 9,900        | 1,200                       | 5,900                     | 725.69          |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_10-12'

**LLI Sample #** SW 6262279  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-12

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 4,000                       | 13,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 6,700                       | 20,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 13,000                      | 40,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 3,500        | J 2,700                     | 13,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 1,500        | J 1,300                     | 6,700                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 6,700                       | 20,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 8,700        | 1,300                       | 6,700                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | 6,200        | J 2,700                     | 6,700                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_10-12'

**LLI Sample #** SW 6262279  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-12

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 4,500        | J 1,300                     | 6,700                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 6,700                       | 20,000                    | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 1,300                       | 6,700                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 6,700                       | 20,000                    | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 4,700        | J 1,300                     | 6,700                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 1,300                       | 6,700                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 2,700                       | 6,700                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 1,300                       | 6,700                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 21,500       | 8.02                        | 31.9                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.59                        | 3.19                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 10.9         | 1.51                        | 3.19                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 1,020        | 0.0638                      | 0.797                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.872        | 0.108                       | 0.797                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 1.97         | 0.223                       | 0.797                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 16,100       | 9.77                        | 31.9                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 77.4         | 0.941                       | 2.39                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 9.53         | 0.303                       | 0.797                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 163          | 0.351                       | 1.59                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 32,500       | 7.51                        | 31.9                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 208          | 0.956                       | 2.39                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 19,400       | 4.05                        | 15.9                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 399          | 0.124                       | 0.797                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 50.2         | 0.303                       | 1.59                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 3,290        | 28.7                        | 79.7                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.56                        | 3.19                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.287                       | 0.797                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 1,200        | 59.5                        | 159                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 2.31                        | 4.78                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 121          | 0.303                       | 0.797                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 215          | 1.05                        | 3.19                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_10-12'

**LLI Sample #** SW 6262279  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-12

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>24.4 | mg/kg<br>0.217              | mg/kg<br>7.56             | 50              |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>38.5     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 06:51       | Stephanie A Selis | 725.69          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 10:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 08:52       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:00       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-77-WC\_10-12' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_10-12'

**LLI Sample #** SW 6262279  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-12

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 01:53       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:01       | Damary Valentin  | 50              |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820002B | 04/22/2011 18:41       | Scott W Freisher | 1               |



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

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**Sample Description:** BH-10-77-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_20-22'

**LLI Sample #** SW 6262280  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 11:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

77-22

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-----------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                       | ug/kg                     |                 |
| 10950   | Acetone                     | 67-64-1      | N.D.       | 730                         | 2,100                     | 69.09           |
| 10950   | Benzene                     | 71-43-2      | N.D.       | 52                          | 520                       | 69.09           |
| 10950   | Bromodichloromethane        | 75-27-4      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Bromoform                   | 75-25-2      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Bromomethane                | 74-83-9      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | 2-Butanone                  | 78-93-3      | N.D.       | 420                         | 1,000                     | 69.09           |
| 10950   | Carbon Disulfide            | 75-15-0      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Carbon Tetrachloride        | 56-23-5      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Chlorobenzene               | 108-90-7     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Chloroethane                | 75-00-3      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | Chloroform                  | 67-66-3      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Chloromethane               | 74-87-3      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | Cyclohexane                 | 110-82-7     | 1,600      | 100                         | 520                       | 69.09           |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | Dibromochloromethane        | 124-48-1     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Ethylbenzene                | 100-41-4     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Freon 113                   | 76-13-1      | N.D.       | 210                         | 1,000                     | 69.09           |
| 10950   | 2-Hexanone                  | 591-78-6     | N.D.       | 310                         | 1,000                     | 69.09           |
| 10950   | Isopropylbenzene            | 98-82-8      | 670        | 100                         | 520                       | 69.09           |
| 10950   | Methyl Acetate              | 79-20-9      | 700        | 210                         | 520                       | 69.09           |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | N.D.       | 52                          | 520                       | 69.09           |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | N.D.       | 310                         | 1,000                     | 69.09           |
| 10950   | Methylcyclohexane           | 108-87-2     | 9,600      | 100                         | 520                       | 69.09           |
| 10950   | Methylene Chloride          | 75-09-2      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | Styrene                     | 100-42-5     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Tetrachloroethene           | 127-18-4     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Toluene                     | 108-88-3     | 110        | 100                         | 520                       | 69.09           |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Trichloroethene             | 79-01-6      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Trichlorofluoromethane      | 75-69-4      | N.D.       | 210                         | 520                       | 69.09           |
| 10950   | Vinyl Chloride              | 75-01-4      | N.D.       | 100                         | 520                       | 69.09           |
| 10950   | Xylene (Total)              | 1330-20-7    | 540        | 100                         | 520                       | 69.09           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_20-22'

**LLI Sample #** SW 6262280  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 11:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

77-22

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 3,200        | J 2,500                     | 13,000                    | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Anthracene                   | 120-12-7            | 5,300        | J 2,500                     | 13,000                    | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 5,300        | J 2,500                     | 13,000                    | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 4,400        | J 2,500                     | 13,000                    | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 3,100        | J 2,500                     | 13,000                    | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 3,000        | J 2,500                     | 13,000                    | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Chrysene                     | 218-01-9            | 9,700        | J 2,500                     | 13,000                    | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 7,500                       | 25,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 13,000                      | 38,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 25,000                      | 75,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 5,000                       | 25,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 3,900        | J 2,500                     | 13,000                    | 5               |
| 10727        | Fluorene                     | 86-73-7             | 4,900        | J 2,500                     | 13,000                    | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 13,000                      | 38,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 3,500        | J 2,500                     | 13,000                    | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 5,000                       | 13,000                    | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_20-22'

**LLI Sample #** SW 6262280  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 11:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

77-22

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 2,900        | J 2,500                     | 13,000                    | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 13,000                      | 38,000                    | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 2,500                       | 13,000                    | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 13,000                      | 38,000                    | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 7,300        | J 2,500                     | 13,000                    | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,500                       | 13,000                    | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 13,000       | J 2,500                     | 13,000                    | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 5,000                       | 13,000                    | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,500                       | 13,000                    | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 25,700       | 7.57                        | 30.1                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.50                        | 3.01                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 29.8         | 1.43                        | 3.01                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 114          | 0.0602                      | 0.752                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.10         | 0.102                       | 0.752                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 0.730        | J 0.211                     | 0.752                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 25,900       | 9.22                        | 30.1                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 67.8         | 0.888                       | 2.26                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 4.70         | 0.286                       | 0.752                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 26.1         | 0.331                       | 1.50                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 18,500       | 7.09                        | 30.1                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 259          | 0.903                       | 2.26                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 23,000       | 3.82                        | 15.0                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 259          | 0.117                       | 0.752                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 17.8         | 0.286                       | 1.50                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 2,790        | 27.1                        | 75.2                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.47                        | 3.01                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.271                       | 0.752                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 921          | 56.1                        | 150                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 2.18                        | 4.51                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 73.0         | 0.286                       | 0.752                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 136          | 0.993                       | 3.01                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-77-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_20-22'

**LLI Sample #** SW 6262280  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-22

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.422 | mg/kg<br>0.0043             | mg/kg<br>0.151            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>34.2      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 12:26       | Stephanie A Selis | 69.09           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 11:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 11:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 11:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 09:18       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:10       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-77-WC\_20-22' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_20-22'

**LLI Sample #** SW 6262280  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 11:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-22

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:04       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A | 1      | 111125711004 | 04/25/2011 10:06       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G  | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_0-2'

LLI Sample # SW 6262281  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 150          | 6                           | 17                        | 0.75            |
| 10950        | Benzene                     | 71-43-2             | 6            | 0.4                         | 4                         | 0.75            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | 2-Butanone                  | 78-93-3             | 7 J          | 3                           | 9                         | 0.75            |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Cyclohexane                 | 110-82-7            | 1 J          | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 9                         | 0.75            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 9                         | 0.75            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.4                         | 4                         | 0.75            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 9                         | 0.75            |
| 10950        | Methylcyclohexane           | 108-87-2            | 3 J          | 0.9                         | 4                         | 0.75            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 4                         | 0.75            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 0.9                         | 4                         | 0.75            |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 0.9                         | 4                         | 0.75            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_0-2'

LLI Sample # SW 6262281  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 380                         | 950                       | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 190                         | 950                       | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 380                         | 950                       | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 190                         | 950                       | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 380                         | 950                       | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 380                         | 950                       | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 380                         | 950                       | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 380                         | 950                       | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 190                         | 950                       | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 190                         | 950                       | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 190                         | 950                       | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 190                         | 950                       | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 570                         | 1,900                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 380                         | 950                       | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 380                         | 950                       | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 380                         | 950                       | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 950                         | 2,900                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 1,900                       | 5,700                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 380                         | 950                       | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 190                         | 950                       | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 380                         | 1,900                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 380                         | 950                       | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 950                         | 2,900                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 190                         | 950                       | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 190                         | 950                       | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 190                         | 950                       | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 380                         | 950                       | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 380                         | 950                       | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-63-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_0-2'

**LLI Sample #** SW 6262281  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 190                         | 950                       | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 190                         | 950                       | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 380                         | 950                       | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 380                         | 950                       | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 190                         | 950                       | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 190                         | 950                       | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 950                         | 2,900                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 190                         | 950                       | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 190                         | 950                       | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 380                         | 950                       | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 950                         | 2,900                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 190                         | 950                       | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 190                         | 950                       | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 190                         | 950                       | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 380                         | 950                       | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 190                         | 950                       | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 13,000       | 5.76                        | 22.9                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.15                        | 2.29                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 6.21         | 1.09                        | 2.29                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 49.5         | 0.0458                      | 0.573                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.550 J      | 0.0779                      | 0.573                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.160                       | 0.573                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 962          | 7.02                        | 22.9                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 21.0         | 0.676                       | 1.72                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 7.43         | 0.218                       | 0.573                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 20.4         | 0.252                       | 1.15                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 18,700       | 5.40                        | 22.9                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 25.2         | 0.687                       | 1.72                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 2,500        | 2.91                        | 11.5                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 302          | 0.0893                      | 0.573                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 14.4         | 0.218                       | 1.15                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,240        | 20.6                        | 57.3                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.12                        | 2.29                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.206                       | 0.573                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 51.2 J       | 42.7                        | 115                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.66                        | 3.44                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 26.5         | 0.218                       | 0.573                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 55.4         | 0.756                       | 2.29                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_0-2'

**LLI Sample #** SW 6262281  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

63-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result        | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|-------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                   |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.0720 J | mg/kg<br>0.0031             | mg/kg<br>0.109            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                   |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>12.7         | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                   |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 04:02       | Stephanie A Selis | 0.75            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 14:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 14:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 14:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 09:43       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:14       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_0-2'

LLI Sample # SW 6262281  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

63-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:07       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:09       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |

**Sample Description:** BH-10-63-WC\_12-14' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_12-14'

**LLI Sample #** SW 6262282  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-12

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 470 J        | 450                         | 1,300                     | 50.69           |
| 10950        | Benzene                     | 71-43-2             | 1,900        | 32                          | 320                       | 50.69           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 260                         | 640                       | 50.69           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | Cyclohexane                 | 110-82-7            | 1,900        | 64                          | 320                       | 50.69           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Ethylbenzene                | 100-41-4            | 80 J         | 64                          | 320                       | 50.69           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 130                         | 640                       | 50.69           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 190                         | 640                       | 50.69           |
| 10950        | Isopropylbenzene            | 98-82-8             | 1,400        | 64                          | 320                       | 50.69           |
| 10950        | Methyl Acetate              | 79-20-9             | 330          | 130                         | 320                       | 50.69           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 32                          | 320                       | 50.69           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 190                         | 640                       | 50.69           |
| 10950        | Methylcyclohexane           | 108-87-2            | 11,000       | 64                          | 320                       | 50.69           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 130                         | 320                       | 50.69           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 64                          | 320                       | 50.69           |
| 10950        | Xylene (Total)              | 1330-20-7           | 92 J         | 64                          | 320                       | 50.69           |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-63-WC\_12-14' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_12-14'

**LLI Sample #** SW 6262282  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-12

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 2,000        | J 1,000                     | 5,200                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 1,700        | J 1,000                     | 5,200                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 3,100        | J 1,000                     | 5,200                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 3,500        | J 1,000                     | 5,200                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 3,000        | J 1,000                     | 5,200                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 3,700        | J 1,000                     | 5,200                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 1,900        | J 1,000                     | 5,200                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 9,000        | 1,000                       | 5,200                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 1,200        | J 1,000                     | 5,200                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 3,800        | J 1,000                     | 5,200                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 3,100                       | 10,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 5,200                       | 16,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 10,000                      | 31,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 4,400        | J 2,100                     | 10,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 2,300        | J 1,000                     | 5,200                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 6,500        | 1,000                       | 5,200                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 5,200                       | 16,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,200        | J 1,000                     | 5,200                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 57,000       | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 2,100                       | 5,200                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_12-14' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_12-14'

**LLI Sample #** SW 6262282  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-12

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 5,400        | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 5,200                       | 16,000                    | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 1,000                       | 5,200                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 5,200                       | 16,000                    | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 14,000       | 1,000                       | 5,200                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 1,000                       | 5,200                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 3,900        | J 1,000                     | 5,200                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 2,100                       | 5,200                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 1,000                       | 5,200                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                                                                          |              |              |              |       |
|---------------|--------------------------------------------------------------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b>                                                      | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum                                                                 | 7429-90-5    | 6,070        | 6.32         | 25.1  |
| 06944         | Antimony                                                                 | 7440-36-0    | 2.61         | 1.26         | 2.51  |
| 06935         | Arsenic                                                                  | 7440-38-2    | 12.0         | 1.19         | 2.51  |
| 06946         | Barium                                                                   | 7440-39-3    | 91.6         | 0.0503       | 0.628 |
| 06947         | Beryllium                                                                | 7440-41-7    | 0.426        | J 0.0854     | 0.628 |
| 06949         | Cadmium                                                                  | 7440-43-9    | N.D.         | 0.176        | 0.628 |
| 01650         | Calcium                                                                  | 7440-70-2    | 9,710        | 7.70         | 25.1  |
| 06951         | Chromium                                                                 | 7440-47-3    | 225          | 0.741        | 1.88  |
| 06952         | Cobalt                                                                   | 7440-48-4    | 10.7         | 0.239        | 0.628 |
| 06953         | Copper                                                                   | 7440-50-8    | 275          | 0.276        | 1.26  |
| 01654         | Iron                                                                     | 7439-89-6    | 65,000       | 29.6         | 126   |
| 06955         | Lead                                                                     | 7439-92-1    | 161          | 0.754        | 1.88  |
| 01657         | Magnesium                                                                | 7439-95-4    | 5,420        | 3.19         | 12.6  |
| 06958         | Manganese                                                                | 7439-96-5    | 707          | 0.0980       | 0.628 |
| 06961         | Nickel                                                                   | 7440-02-0    | 35.0         | 0.239        | 1.26  |
| 01662         | Potassium                                                                | 7440-09-7    | 817          | 22.6         | 62.8  |
| 06936         | Selenium                                                                 | 7782-49-2    | N.D.         | 6.16         | 12.6  |
|               | Reporting limits were raised due to interference from the sample matrix. |              |              |              |       |
| 06966         | Silver                                                                   | 7440-22-4    | N.D.         | 0.226        | 0.628 |
| 01667         | Sodium                                                                   | 7440-23-5    | 290          | 46.9         | 126   |
| 06925         | Thallium                                                                 | 7440-28-0    | 1.84         | J 1.82       | 3.77  |
| 06971         | Vanadium                                                                 | 7440-62-2    | 35.7         | 0.239        | 0.628 |
| 06972         | Zinc                                                                     | 7440-66-6    | 404          | 0.829        | 2.51  |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_12-14' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_12-14'

**LLI Sample #** SW 6262282  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

63-12

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.670 | mg/kg<br>0.0034             | mg/kg<br>0.118            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>21.2      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 07:36       | Stephanie A Selis | 50.69           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 14:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 10:09       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:20       | Joanne M Gates    | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:20       | Joanne M Gates    | 5               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_12-14' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_12-14'

**LLI Sample #** SW 6262282  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

63-12

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:11       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A | 1      | 111125711004 | 04/25/2011 10:10       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G  | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |



**Sample Description:** BH-10-63-WC\_21-23' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_21-23'

**LLI Sample #** SW 6262283  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-21

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 620                         | 1,800                     | 62.74           |
| 10950        | Benzene                     | 71-43-2             | 510          | 44                          | 440                       | 62.74           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 350                         | 880                       | 62.74           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Cyclohexane                 | 110-82-7            | 1,900        | 88                          | 440                       | 62.74           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Ethylbenzene                | 100-41-4            | 120 J        | 88                          | 440                       | 62.74           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 180                         | 880                       | 62.74           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 270                         | 880                       | 62.74           |
| 10950        | Isopropylbenzene            | 98-82-8             | 1,000        | 88                          | 440                       | 62.74           |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 44                          | 440                       | 62.74           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 270                         | 880                       | 62.74           |
| 10950        | Methylcyclohexane           | 108-87-2            | 10,000       | 88                          | 440                       | 62.74           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 180                         | 440                       | 62.74           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 88                          | 440                       | 62.74           |
| 10950        | Xylene (Total)              | 1330-20-7           | 230 J        | 88                          | 440                       | 62.74           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_21-23' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_21-23'

**LLI Sample #** SW 6262283  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-21

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 1,200        | 230                         | 1,200                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | 740          | J 230                       | 1,200                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 930          | J 230                       | 1,200                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 770          | J 230                       | 1,200                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 780          | J 230                       | 1,200                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 670          | J 230                       | 1,200                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 320          | J 230                       | 1,200                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | 240          | J 230                       | 1,200                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 1,600        | 230                         | 1,200                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 340          | J 230                       | 1,200                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 950          | J 230                       | 1,200                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 690                         | 2,300                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | 850          | J 460                       | 1,200                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,200                       | 3,500                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,300                       | 6,900                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | 1,600        | J 460                       | 2,300                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 870          | J 230                       | 1,200                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | 1,600        | 230                         | 1,200                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,200                       | 3,500                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 370          | J 230                       | 1,200                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 4,000        | 230                         | 1,200                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 460                         | 1,200                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_21-23' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_21-23'

**LLI Sample #** SW 6262283  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

63-21

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 1,100        | J 230                       | 1,200                     | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,200                       | 3,500                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 230                         | 1,200                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,200                       | 3,500                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 3,700        | 230                         | 1,200                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 230                         | 1,200                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 1,600        | 230                         | 1,200                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 460                         | 1,200                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 230                         | 1,200                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 8,110        | 6.95         | 27.6  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.38         | 2.76  |
| 06935         | Arsenic             | 7440-38-2    | 8.88         | 1.31         | 2.76  |
| 06946         | Barium              | 7440-39-3    | 140          | 0.0552       | 0.690 |
| 06947         | Beryllium           | 7440-41-7    | 0.452 J      | 0.0939       | 0.690 |
| 06949         | Cadmium             | 7440-43-9    | 0.229 J      | 0.193        | 0.690 |
| 01650         | Calcium             | 7440-70-2    | 19,200       | 8.46         | 27.6  |
| 06951         | Chromium            | 7440-47-3    | 42.1         | 0.815        | 2.07  |
| 06952         | Cobalt              | 7440-48-4    | 5.36         | 0.262        | 0.690 |
| 06953         | Copper              | 7440-50-8    | 61.3         | 0.304        | 1.38  |
| 01654         | Iron                | 7439-89-6    | 19,500       | 6.50         | 27.6  |
| 06955         | Lead                | 7439-92-1    | 115          | 0.829        | 2.07  |
| 01657         | Magnesium           | 7439-95-4    | 9,560        | 3.51         | 13.8  |
| 06958         | Manganese           | 7439-96-5    | 387          | 0.108        | 0.690 |
| 06961         | Nickel              | 7440-02-0    | 67.4         | 0.262        | 1.38  |
| 01662         | Potassium           | 7440-09-7    | 1,200        | 24.9         | 69.0  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.35         | 2.76  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.249        | 0.690 |
| 01667         | Sodium              | 7440-23-5    | 491          | 51.5         | 138   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 2.00         | 4.14  |
| 06971         | Vanadium            | 7440-62-2    | 31.1         | 0.262        | 0.690 |
| 06972         | Zinc                | 7440-66-6    | 110          | 0.911        | 2.76  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-63-WC\_21-23' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_21-23'

**LLI Sample #** SW 6262283  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

63-21

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>2.36 | mg/kg<br>0.0200             | mg/kg<br>0.696            | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>29.0     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 12:49       | Stephanie A Selis | 62.74           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 15:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 10:35       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:24       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-63-WC\_21-23' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-63-WC\_21-23'

**LLI Sample #** SW 6262283  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

63-21

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:14       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 11:32       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_0-2'

**LLI Sample #** SW 6262284  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:20 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

64-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 310          | 8                           | 24                        | 1.01            |
| 10950        | Benzene                     | 71-43-2             | 150          | 0.6                         | 6                         | 1.01            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | 2-Butanone                  | 78-93-3             | 26           | 5                           | 12                        | 1.01            |
| 10950        | Carbon Disulfide            | 75-15-0             | 3 J          | 1                           | 6                         | 1.01            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Cyclohexane                 | 110-82-7            | 39           | 1                           | 6                         | 1.01            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Ethylbenzene                | 100-41-4            | 21           | 1                           | 6                         | 1.01            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 12                        | 1.01            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 12                        | 1.01            |
| 10950        | Isopropylbenzene            | 98-82-8             | 19           | 1                           | 6                         | 1.01            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                         | 6                         | 1.01            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 12                        | 1.01            |
| 10950        | Methylcyclohexane           | 108-87-2            | 99           | 1                           | 6                         | 1.01            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Toluene                     | 108-88-3            | 13           | 1                           | 6                         | 1.01            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | 1 J          | 1                           | 6                         | 1.01            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 6                         | 1.01            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 6                         | 1.01            |
| 10950        | Xylene (Total)              | 1330-20-7           | 43           | 1                           | 6                         | 1.01            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_0-2'

**LLI Sample #** SW 6262284  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 41,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 120,000      | 2,000                       | 9,800                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 54,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 96,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 10,000       | 2,000                       | 9,800                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 83,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | 73,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 5,900                       | 20,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 9,800                       | 29,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 20,000                      | 59,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 3,900                       | 20,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 2,200        | J 2,000                     | 9,800                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 9,800                       | 29,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 59,000       | 2,000                       | 9,800                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 3,900                       | 9,800                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_0-2'

**LLI Sample #** SW 6262284  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 9,800                       | 29,000                    | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 2,000                       | 9,800                     | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 9,800                       | 29,000                    | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 2,100        | J 2,000                     | 9,800                     | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,000                       | 9,800                     | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 8,400        | J 2,000                     | 9,800                     | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 3,900                       | 9,800                     | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,000                       | 9,800                     | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 10,200       | 5.70                        | 22.7                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.13                        | 2.27                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 10.1         | 1.08                        | 2.27                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 114          | 0.0454                      | 0.567                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.427        | J 0.0771                    | 0.567                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 0.193        | J 0.159                     | 0.567                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 7,050        | 6.95                        | 22.7                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 69.5         | 0.669                       | 1.70                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 6.70         | 0.215                       | 0.567                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 59.9         | 0.249                       | 1.13                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 31,600       | 26.7                        | 113                       | 5               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 229          | 0.680                       | 1.70                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 4,450        | 2.88                        | 11.3                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 413          | 0.0884                      | 0.567                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 63.1         | 0.215                       | 1.13                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,260        | 20.4                        | 56.7                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.11                        | 2.27                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.204                       | 0.567                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 122          | 42.3                        | 113                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.64                        | 3.40                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 163          | 0.215                       | 0.567                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 234          | 0.748                       | 2.27                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-64-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_0-2'

**LLI Sample #** SW 6262284  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:20 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

64-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>2.24 | mg/kg<br>0.0162             | mg/kg<br>0.565            | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>15.2     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 08:10       | Stephanie A Selis | 1.01            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 15:20       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 11:01       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:31       | Joanne M Gates    | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:27       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-64-WC\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_0-2'

**LLI Sample #** SW 6262284  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:20 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

64-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:18       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 11:33       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_11-13' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_11-13'

**LLI Sample #** SW 6262285  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

64-11

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 900                         | 2,600                     | 104.58          |
| 10950        | Benzene                     | 71-43-2             | 19,000       | 65                          | 650                       | 104.58          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 520                         | 1,300                     | 104.58          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | Cyclohexane                 | 110-82-7            | 2,800        | 130                         | 650                       | 104.58          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | 9,300        | 130                         | 650                       | 104.58          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Ethylbenzene                | 100-41-4            | 2,400        | 130                         | 650                       | 104.58          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 260                         | 1,300                     | 104.58          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 390                         | 1,300                     | 104.58          |
| 10950        | Isopropylbenzene            | 98-82-8             | 4,500        | 130                         | 650                       | 104.58          |
| 10950        | Methyl Acetate              | 79-20-9             | 330          | J 260                       | 650                       | 104.58          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 65                          | 650                       | 104.58          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 390                         | 1,300                     | 104.58          |
| 10950        | Methylcyclohexane           | 108-87-2            | 16,000       | 130                         | 650                       | 104.58          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Toluene                     | 108-88-3            | 640          | J 130                       | 650                       | 104.58          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 260                         | 650                       | 104.58          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 130                         | 650                       | 104.58          |
| 10950        | Xylene (Total)              | 1330-20-7           | 5,700        | 130                         | 650                       | 104.58          |

The percent recovery for cyclohexane was outside QC limits high in the LCS associated with this sample. Since the recovery was high and this compound was

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_11-13' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_11-13'

**LLI Sample #** SW 6262285  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-11

| CAT No.                                                         | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| detected in the sample, the result reported may be biased high. |                              |                     |              |                             |                           |                 |
| <b>GC/MS</b>                                                    | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727                                                           | Acenaphthene                 | 83-32-9             | 3,400        | 200                         | 1,000                     | 5               |
| 10727                                                           | Acenaphthylene               | 208-96-8            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Acetophenone                 | 98-86-2             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | Anthracene                   | 120-12-7            | 2,900        | 200                         | 1,000                     | 5               |
| 10727                                                           | Atrazine                     | 1912-24-9           | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Benzaldehyde                 | 100-52-7            | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | Benzo(a)anthracene           | 56-55-3             | 3,400        | 200                         | 1,000                     | 5               |
| 10727                                                           | Benzo(a)pyrene               | 50-32-8             | 2,800        | 200                         | 1,000                     | 5               |
| 10727                                                           | Benzo(b)fluoranthene         | 205-99-2            | 3,300        | 200                         | 1,000                     | 5               |
| 10727                                                           | Benzo(g,h,i)perylene         | 191-24-2            | 1,800        | 200                         | 1,000                     | 5               |
| 10727                                                           | Benzo(k)fluoranthene         | 207-08-9            | 1,100        | 200                         | 1,000                     | 5               |
| 10727                                                           | 1,1'-Biphenyl                | 92-52-4             | 2,100        | 200                         | 1,000                     | 5               |
| 10727                                                           | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Butylbenzylphthalate         | 85-68-7             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | Di-n-butylphthalate          | 84-74-2             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | Caprolactam                  | 105-60-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Carbazole                    | 86-74-8             | 480          | 200                         | 1,000                     | 5               |
| 10727                                                           | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | 4-Chloroaniline              | 106-47-8            | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | 2-Chlorophenol               | 95-57-8             | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Chrysene                     | 218-01-9            | 4,000        | 200                         | 1,000                     | 5               |
| 10727                                                           | Dibenz(a,h)anthracene        | 53-70-3             | 640          | 200                         | 1,000                     | 5               |
| 10727                                                           | Dibenzofuran                 | 132-64-9            | 2,200        | 200                         | 1,000                     | 5               |
| 10727                                                           | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 610                         | 2,000                     | 5               |
| 10727                                                           | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Diethylphthalate             | 84-66-2             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | 2,4-Dimethylphenol           | 105-67-9            | 2,200        | 410                         | 1,000                     | 5               |
| 10727                                                           | Dimethylphthalate            | 131-11-3            | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,000                       | 3,100                     | 5               |
| 10727                                                           | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,000                       | 6,100                     | 5               |
| 10727                                                           | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 410                         | 2,000                     | 5               |
| 10727                                                           | Fluoranthene                 | 206-44-0            | 7,500        | 200                         | 1,000                     | 5               |
| 10727                                                           | Fluorene                     | 86-73-7             | 4,300        | 200                         | 1,000                     | 5               |
| 10727                                                           | Hexachlorobenzene            | 118-74-1            | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Hexachlorobutadiene          | 87-68-3             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,000                       | 3,100                     | 5               |
| 10727                                                           | Hexachloroethane             | 67-72-1             | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 1,400        | 200                         | 1,000                     | 5               |
| 10727                                                           | Isophorone                   | 78-59-1             | N.D.         | 200                         | 1,000                     | 5               |
| 10727                                                           | 2-Methylnaphthalene          | 91-57-6             | 38,000       | 2,000                       | 10,000                    | 50              |
| 10727                                                           | 2-Methylphenol               | 95-48-7             | N.D.         | 410                         | 1,000                     | 5               |
| 10727                                                           | 4-Methylphenol               | 106-44-5            | N.D.         | 410                         | 1,000                     | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-64-WC\_11-13' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_11-13'

LLI Sample # SW 6262285  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 15:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-11

| CAT No. | Analysis Name                                                                                                                                                                                               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Semivolatiles                                                                                                                                                                                               | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
|         | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |              |            |                             |                           |                 |
| 10727   | Naphthalene                                                                                                                                                                                                 | 91-20-3      | 8,400      | 200                         | 1,000                     | 5               |
| 10727   | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4      | N.D.       | 200                         | 1,000                     | 5               |
| 10727   | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2      | N.D.       | 410                         | 1,000                     | 5               |
| 10727   | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6     | N.D.       | 410                         | 1,000                     | 5               |
| 10727   | Nitrobenzene                                                                                                                                                                                                | 98-95-3      | N.D.       | 200                         | 1,000                     | 5               |
| 10727   | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5      | N.D.       | 200                         | 1,000                     | 5               |
| 10727   | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7     | N.D.       | 1,000                       | 3,100                     | 5               |
| 10727   | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7     | N.D.       | 200                         | 1,000                     | 5               |
| 10727   | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6      | N.D.       | 200                         | 1,000                     | 5               |
|         | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |              |            |                             |                           |                 |
| 10727   | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0     | N.D.       | 410                         | 1,000                     | 5               |
| 10727   | Pentachlorophenol                                                                                                                                                                                           | 87-86-5      | N.D.       | 1,000                       | 3,100                     | 5               |
| 10727   | Phenanthrene                                                                                                                                                                                                | 85-01-8      | 14,000     | 200                         | 1,000                     | 5               |
| 10727   | Phenol                                                                                                                                                                                                      | 108-95-2     | N.D.       | 200                         | 1,000                     | 5               |
| 10727   | Pyrene                                                                                                                                                                                                      | 129-00-0     | 7,300      | 200                         | 1,000                     | 5               |
| 10727   | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4      | N.D.       | 410                         | 1,000                     | 5               |
| 10727   | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2      | N.D.       | 200                         | 1,000                     | 5               |
|         | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |              |            |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 11,600       | 6.10         | 24.2  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.21         | 2.42  |
| 06935         | Arsenic             | 7440-38-2    | 11.0         | 1.15         | 2.42  |
| 06946         | Barium              | 7440-39-3    | 215          | 0.0485       | 0.606 |
| 06947         | Beryllium           | 7440-41-7    | 0.648        | 0.0824       | 0.606 |
| 06949         | Cadmium             | 7440-43-9    | 0.175        | 0.170        | 0.606 |
| 01650         | Calcium             | 7440-70-2    | 5,670        | 7.43         | 24.2  |
| 06951         | Chromium            | 7440-47-3    | 23.6         | 0.715        | 1.82  |
| 06952         | Cobalt              | 7440-48-4    | 6.67         | 0.230        | 0.606 |
| 06953         | Copper              | 7440-50-8    | 53.2         | 0.267        | 1.21  |
| 01654         | Iron                | 7439-89-6    | 17,500       | 5.71         | 24.2  |
| 06955         | Lead                | 7439-92-1    | 330          | 0.727        | 1.82  |
| 01657         | Magnesium           | 7439-95-4    | 2,330        | 3.08         | 12.1  |
| 06958         | Manganese           | 7439-96-5    | 153          | 0.0945       | 0.606 |
| 06961         | Nickel              | 7440-02-0    | 15.9         | 0.230        | 1.21  |
| 01662         | Potassium           | 7440-09-7    | 1,510        | 21.8         | 60.6  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.19         | 2.42  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.218        | 0.606 |
| 01667         | Sodium              | 7440-23-5    | 276          | 45.2         | 121   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.76         | 3.64  |
| 06971         | Vanadium            | 7440-62-2    | 30.6         | 0.230        | 0.606 |
| 06972         | Zinc                | 7440-66-6    | 196          | 0.800        | 2.42  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_11-13' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_11-13'

**LLI Sample #** SW 6262285  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

64-11

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>N.D. | mg/kg<br>0.0035             | mg/kg<br>0.122            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>19.1     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111162AA    | 04/27/2011 02:27       | Stephanie A Selis | 104.58          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 15:40       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 15:40       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 11:27       | Brian K Graham    | 5               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/26/2011 02:34       | Brian K Graham    | 50              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:34       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_11-13' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_11-13'

**LLI Sample #** SW 6262285  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 15:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

64-11

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder    | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:21       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:14       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001A | 04/22/2011 18:08       | Scott W Freisher | 1               |

**Sample Description:** BH-10-64-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_24-26'

LLI Sample # SW 6262286  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 16:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-24

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 140          | 12                          | 35                        | 1.02            |
| 10950        | Benzene                     | 71-43-2             | 30           | 0.9                         | 9                         | 1.02            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | 2-Butanone                  | 78-93-3             | 13 J         | 7                           | 18                        | 1.02            |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Cyclohexane                 | 110-82-7            | 81           | 2                           | 9                         | 1.02            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 4                           | 18                        | 1.02            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 5                           | 18                        | 1.02            |
| 10950        | Isopropylbenzene            | 98-82-8             | 3 J          | 2                           | 9                         | 1.02            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.9                         | 9                         | 1.02            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 5                           | 18                        | 1.02            |
| 10950        | Methylcyclohexane           | 108-87-2            | 110          | 2                           | 9                         | 1.02            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 4                           | 9                         | 1.02            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 2                           | 9                         | 1.02            |
| 10950        | Xylene (Total)              | 1330-20-7           | 2 J          | 2                           | 9                         | 1.02            |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-64-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_24-26'

LLI Sample # SW 6262286  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

64-24

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 860                         | 2,900                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,400                       | 4,300                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,900                       | 8,600                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 570                         | 2,900                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,400                       | 4,300                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 570                         | 1,400                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_24-26'

**LLI Sample #** SW 6262286  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 16:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

64-24

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,400                       | 4,300                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 290                         | 1,400                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,400                       | 4,300                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 290                         | 1,400                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 570                         | 1,400                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 290                         | 1,400                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

| Metals |           | SW-846 6010B | mg/kg   | mg/kg  | mg/kg |   |
|--------|-----------|--------------|---------|--------|-------|---|
| 01643  | Aluminum  | 7429-90-5    | 26,600  | 8.64   | 34.4  | 1 |
| 06944  | Antimony  | 7440-36-0    | N.D.    | 1.72   | 3.44  | 1 |
| 06935  | Arsenic   | 7440-38-2    | 7.70    | 1.63   | 3.44  | 1 |
| 06946  | Barium    | 7440-39-3    | 186     | 0.0687 | 0.859 | 1 |
| 06947  | Beryllium | 7440-41-7    | 1.18    | 0.117  | 0.859 | 1 |
| 06949  | Cadmium   | 7440-43-9    | N.D.    | 0.241  | 0.859 | 1 |
| 01650  | Calcium   | 7440-70-2    | 3,910   | 10.5   | 34.4  | 1 |
| 06951  | Chromium  | 7440-47-3    | 51.8    | 1.01   | 2.58  | 1 |
| 06952  | Cobalt    | 7440-48-4    | 11.4    | 0.326  | 0.859 | 1 |
| 06953  | Copper    | 7440-50-8    | 8.22    | 0.378  | 1.72  | 1 |
| 01654  | Iron      | 7439-89-6    | 29,500  | 8.09   | 34.4  | 1 |
| 06955  | Lead      | 7439-92-1    | 17.4    | 1.03   | 2.58  | 1 |
| 01657  | Magnesium | 7439-95-4    | 6,980   | 4.36   | 17.2  | 1 |
| 06958  | Manganese | 7439-96-5    | 407     | 0.134  | 0.859 | 1 |
| 06961  | Nickel    | 7440-02-0    | 27.2    | 0.326  | 1.72  | 1 |
| 01662  | Potassium | 7440-09-7    | 2,690   | 30.9   | 85.9  | 1 |
| 06936  | Selenium  | 7782-49-2    | N.D.    | 1.68   | 3.44  | 1 |
| 06966  | Silver    | 7440-22-4    | 0.832 J | 0.309  | 0.859 | 1 |
| 01667  | Sodium    | 7440-23-5    | 299     | 64.1   | 172   | 1 |
| 06925  | Thallium  | 7440-28-0    | N.D.    | 2.49   | 5.15  | 1 |
| 06971  | Vanadium  | 7440-62-2    | 59.0    | 0.326  | 0.859 | 1 |
| 06972  | Zinc      | 7440-66-6    | 66.7    | 1.13   | 3.44  | 1 |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-64-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_24-26'

**LLI Sample #** SW 6262286  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 16:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

64-24

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result        | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|-------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                   |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.0127 J | mg/kg<br>0.0048             | mg/kg<br>0.166            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                   |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>41.8         | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                   |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 08:33       | Stephanie A Selis | 1.02            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 16:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 16:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 11:53       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:37       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:37       | Joanne M Gates    | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-64-WC\_24-26' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-64-WC\_24-26'

**LLI Sample #** SW 6262286  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 16:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

64-24

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:24       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:15       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 5

**Sample Description:** BH-10-77-WC\_6.5-7' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_6.5-7'

**LLI Sample #** SW 6262287  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-65

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-----------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                       | ug/kg                     |                 |
| 10950   | Acetone                     | 67-64-1      | N.D.       | 790                         | 2,300                     | 86.54           |
| 10950   | Benzene                     | 71-43-2      | 120 J      | 56                          | 560                       | 86.54           |
| 10950   | Bromodichloromethane        | 75-27-4      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Bromoform                   | 75-25-2      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Bromomethane                | 74-83-9      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | 2-Butanone                  | 78-93-3      | N.D.       | 450                         | 1,100                     | 86.54           |
| 10950   | Carbon Disulfide            | 75-15-0      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Carbon Tetrachloride        | 56-23-5      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Chlorobenzene               | 108-90-7     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Chloroethane                | 75-00-3      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | Chloroform                  | 67-66-3      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Chloromethane               | 74-87-3      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | Cyclohexane                 | 110-82-7     | 320 J      | 110                         | 560                       | 86.54           |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | Dibromochloromethane        | 124-48-1     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Ethylbenzene                | 100-41-4     | 210 J      | 110                         | 560                       | 86.54           |
| 10950   | Freon 113                   | 76-13-1      | N.D.       | 230                         | 1,100                     | 86.54           |
| 10950   | 2-Hexanone                  | 591-78-6     | N.D.       | 340                         | 1,100                     | 86.54           |
| 10950   | Isopropylbenzene            | 98-82-8      | 280 J      | 110                         | 560                       | 86.54           |
| 10950   | Methyl Acetate              | 79-20-9      | 290 J      | 230                         | 560                       | 86.54           |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | N.D.       | 56                          | 560                       | 86.54           |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | N.D.       | 340                         | 1,100                     | 86.54           |
| 10950   | Methylcyclohexane           | 108-87-2     | 1,600      | 110                         | 560                       | 86.54           |
| 10950   | Methylene Chloride          | 75-09-2      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | Styrene                     | 100-42-5     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Tetrachloroethene           | 127-18-4     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Toluene                     | 108-88-3     | 210 J      | 110                         | 560                       | 86.54           |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Trichloroethene             | 79-01-6      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Trichlorofluoromethane      | 75-69-4      | N.D.       | 230                         | 560                       | 86.54           |
| 10950   | Vinyl Chloride              | 75-01-4      | N.D.       | 110                         | 560                       | 86.54           |
| 10950   | Xylene (Total)              | 1330-20-7    | 1,500      | 110                         | 560                       | 86.54           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_6.5-7' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_6.5-7'

LLI Sample # SW 6262287  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

77-65

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 6,500                       | 22,000                    | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 11,000                      | 33,000                    | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 22,000                      | 65,000                    | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 4,400                       | 22,000                    | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 11,000                      | 33,000                    | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 4,400                       | 11,000                    | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_6.5-7' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_6.5-7'

**LLI Sample #** SW 6262287  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/13/2011 10:45 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

77-65

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 11,000                      | 33,000                    | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 2,200                       | 11,000                    | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 11,000                      | 33,000                    | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 2,200                       | 11,000                    | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 4,400                       | 11,000                    | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,200                       | 11,000                    | 1               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 1,270        | 6.31                        | 25.1                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.26                        | 2.51                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 2.14 J       | 1.19                        | 2.51                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 62.9         | 0.0502                      | 0.628                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | N.D.         | 0.0854                      | 0.628                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.176                       | 0.628                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 3,610        | 7.69                        | 25.1                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 4.81         | 0.741                       | 1.88                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 0.443 J      | 0.239                       | 0.628                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 3.41         | 0.276                       | 1.26                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 2,280        | 5.91                        | 25.1                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 131          | 0.753                       | 1.88                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 2,830        | 3.19                        | 12.6                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 33.5         | 0.0979                      | 0.628                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 4.97         | 0.239                       | 1.26                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 151          | 22.6                        | 62.8                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.23                        | 2.51                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.226                       | 0.628                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 48.1 J       | 46.8                        | 126                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.82                        | 3.77                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 7.82         | 0.239                       | 0.628                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 15.7         | 0.828                       | 2.51                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-77-WC\_6.5-7' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_6.5-7'

**LLI Sample #** SW 6262287  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-65

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.264 | mg/kg<br>0.0035             | mg/kg<br>0.123            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>23.4      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111161AA    | 04/26/2011 10:09       | Stephanie A Selis | 86.54           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/13/2011 10:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/13/2011 10:45       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 12:18       | Brian K Graham    | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:51       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-77-WC\_6.5-7' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-77-WC\_6.5-7'

**LLI Sample #** SW 6262287  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/13/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

77-65

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:28       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A | 1      | 111125711004 | 04/25/2011 10:17       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G  | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-43\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-43\_0-2'

LLI Sample # SW 6262288  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

43-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 91           | 6                           | 18                        | 0.74            |
| 10950        | Benzene                     | 71-43-2             | 12           | 0.4                         | 4                         | 0.74            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 2-Butanone                  | 78-93-3             | 11           | 4                           | 9                         | 0.74            |
| 10950        | Carbon Disulfide            | 75-15-0             | 4 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Ethylbenzene                | 100-41-4            | 1 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 9                         | 0.74            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.4                         | 4                         | 0.74            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Methylcyclohexane           | 108-87-2            | 1 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Toluene                     | 108-88-3            | 2 J          | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 0.9                         | 4                         | 0.74            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-43\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-43\_0-2'

**LLI Sample #** SW 6262288  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

43-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 390                         | 980                       | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 590                         | 2,000                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,000                       | 5,900                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 390                         | 980                       | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 390                         | 2,000                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 390                         | 980                       | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-43\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-43\_0-2'

LLI Sample # SW 6262288  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

43-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 200                         | 980                       | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 200                         | 980                       | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 390                         | 980                       | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 390                         | 980                       | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 200                         | 980                       | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 200                         | 980                       | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 980                         | 2,900                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 200                         | 980                       | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 200                         | 980                       | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 390                         | 980                       | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 980                         | 2,900                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 200                         | 980                       | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 200                         | 980                       | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 200                         | 980                       | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 390                         | 980                       | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 200                         | 980                       | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 18,800       | 5.79                        | 23.0                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.15                        | 2.30                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 14.7         | 1.09                        | 2.30                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 212          | 0.0460                      | 0.575                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.692        | 0.0782                      | 0.575                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.161                       | 0.575                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 18,100       | 7.05                        | 23.0                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 56.0         | 0.679                       | 1.73                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 8.32         | 0.219                       | 0.575                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 98.2         | 0.253                       | 1.15                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 23,000       | 5.42                        | 23.0                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 167          | 0.690                       | 1.73                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 6,630        | 2.92                        | 11.5                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 451          | 0.0897                      | 0.575                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 37.6         | 0.219                       | 1.15                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,430        | 20.7                        | 57.5                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.13                        | 2.30                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.207                       | 0.575                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 130          | 42.9                        | 115                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.67                        | 3.45                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 84.8         | 0.219                       | 0.575                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 113          | 0.759                       | 2.30                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-43\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-43\_0-2'

**LLI Sample #** SW 6262288  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

43-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result       | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                  |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.111 J | mg/kg<br>0.0033             | mg/kg<br>0.116            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                  |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>15.6        | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                  |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111151AA    | 04/25/2011 21:33       | Sara E Johnson    | 0.74            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 09:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 09:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 12:44       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:54       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-43\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-43\_0-2'

**LLI Sample #** SW 6262288  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 09:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

43-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:32       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:18       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-48\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-48\_0-2'

LLI Sample # SW 6262289  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

48-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 110          | 7                           | 19                        | 0.76            |
| 10950        | Benzene                     | 71-43-2             | 7            | 0.5                         | 5                         | 0.76            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | 2-Butanone                  | 78-93-3             | 17           | 4                           | 10                        | 0.76            |
| 10950        | Carbon Disulfide            | 75-15-0             | 2 J          | 1                           | 5                         | 0.76            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Cyclohexane                 | 110-82-7            | 16           | 1                           | 5                         | 0.76            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Ethylbenzene                | 100-41-4            | 1 J          | 1                           | 5                         | 0.76            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 10                        | 0.76            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 10                        | 0.76            |
| 10950        | Isopropylbenzene            | 98-82-8             | 13           | 1                           | 5                         | 0.76            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                         | 5                         | 0.76            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 10                        | 0.76            |
| 10950        | Methylcyclohexane           | 108-87-2            | 81           | 1                           | 5                         | 0.76            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Toluene                     | 108-88-3            | 2 J          | 1                           | 5                         | 0.76            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 5                         | 0.76            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 5                         | 0.76            |
| 10950        | Xylene (Total)              | 1330-20-7           | 14           | 1                           | 5                         | 0.76            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-48\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-48\_0-2'

**LLI Sample #** SW 6262289  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

48-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | J            | 210                         | 1,000                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 420          | J                           | 210                       | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 610          | J                           | 210                       | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 420          | J                           | 210                       | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 430          | J                           | 210                       | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 620                         | 2,100                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,000                       | 3,100                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,100                       | 6,200                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 420                         | 2,100                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 510          | J                           | 210                       | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,000                       | 3,100                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 310          | J                           | 210                       | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 210                         | 1,000                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 580          | J                           | 210                       | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 420                         | 1,000                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 420                         | 1,000                     | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-48\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-48\_0-2'

LLI Sample # SW 6262289  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

48-02

| CAT No. | Analysis Name                                                                                                                                                                                               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Semivolatiles                                                                                                                                                                                               | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
|         | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |              |            |                             |                           |                 |
| 10727   | Naphthalene                                                                                                                                                                                                 | 91-20-3      | 230 J      | 210                         | 1,000                     | 5               |
| 10727   | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4      | N.D.       | 210                         | 1,000                     | 5               |
| 10727   | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2      | N.D.       | 420                         | 1,000                     | 5               |
| 10727   | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6     | N.D.       | 420                         | 1,000                     | 5               |
| 10727   | Nitrobenzene                                                                                                                                                                                                | 98-95-3      | N.D.       | 210                         | 1,000                     | 5               |
| 10727   | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5      | N.D.       | 210                         | 1,000                     | 5               |
| 10727   | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7     | N.D.       | 1,000                       | 3,100                     | 5               |
| 10727   | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7     | N.D.       | 210                         | 1,000                     | 5               |
| 10727   | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6      | N.D.       | 210                         | 1,000                     | 5               |
|         | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |              |            |                             |                           |                 |
| 10727   | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0     | N.D.       | 420                         | 1,000                     | 5               |
| 10727   | Pentachlorophenol                                                                                                                                                                                           | 87-86-5      | N.D.       | 1,000                       | 3,100                     | 5               |
| 10727   | Phenanthrene                                                                                                                                                                                                | 85-01-8      | 420 J      | 210                         | 1,000                     | 5               |
| 10727   | Phenol                                                                                                                                                                                                      | 108-95-2     | N.D.       | 210                         | 1,000                     | 5               |
| 10727   | Pyrene                                                                                                                                                                                                      | 129-00-0     | 470 J      | 210                         | 1,000                     | 5               |
| 10727   | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4      | N.D.       | 420                         | 1,000                     | 5               |
| 10727   | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2      | N.D.       | 210                         | 1,000                     | 5               |
|         | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |              |            |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 22,200       | 6.06         | 24.1  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.21         | 2.41  |
| 06935         | Arsenic             | 7440-38-2    | 20.0         | 1.15         | 2.41  |
| 06946         | Barium              | 7440-39-3    | 317          | 0.0482       | 0.603 |
| 06947         | Beryllium           | 7440-41-7    | 0.857        | 0.0820       | 0.603 |
| 06949         | Cadmium             | 7440-43-9    | 2.22         | 0.169        | 0.603 |
| 01650         | Calcium             | 7440-70-2    | 93,700       | 36.9         | 121   |
| 06951         | Chromium            | 7440-47-3    | 250          | 0.711        | 1.81  |
| 06952         | Cobalt              | 7440-48-4    | 8.12         | 0.229        | 0.603 |
| 06953         | Copper              | 7440-50-8    | 187          | 0.265        | 1.21  |
| 01654         | Iron                | 7439-89-6    | 42,300       | 28.4         | 121   |
| 06955         | Lead                | 7439-92-1    | 278          | 0.723        | 1.81  |
| 01657         | Magnesium           | 7439-95-4    | 36,900       | 3.06         | 12.1  |
| 06958         | Manganese           | 7439-96-5    | 2,810        | 0.470        | 3.01  |
| 06961         | Nickel              | 7440-02-0    | 52.0         | 0.229        | 1.21  |
| 01662         | Potassium           | 7440-09-7    | 1,260        | 21.7         | 60.3  |
| 06936         | Selenium            | 7782-49-2    | 2.58         | 1.18         | 2.41  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.217        | 0.603 |
| 01667         | Sodium              | 7440-23-5    | 748          | 45.0         | 121   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.75         | 3.62  |
| 06971         | Vanadium            | 7440-62-2    | 233          | 0.229        | 0.603 |
| 06972         | Zinc                | 7440-66-6    | 750          | 0.796        | 2.41  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-48\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-48\_0-2'

**LLI Sample #** SW 6262289  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

48-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result        | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|-------------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                   |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.0867 J | mg/kg<br>0.0035             | mg/kg<br>0.121            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                   |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>21.0         | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                   |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 08:55       | Stephanie A Selis | 0.76            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 09:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 09:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 09:45       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11110SLD026  | 04/25/2011 13:10       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11110SLD026  | 04/21/2011 09:30       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:01       | Joanne M Gates    | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:01       | Joanne M Gates    | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:01       | Joanne M Gates    | 5               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 09:58       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-48\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-48\_0-2'

**LLI Sample #** SW 6262289  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 09:45 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

48-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:35       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:19       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-51\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-51\_0-2'

LLI Sample # SW 6262290  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

51-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 210          | 9                           | 27                        | 0.99            |
| 10950        | Benzene                     | 71-43-2             | 6 J          | 0.7                         | 7                         | 0.99            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | 2-Butanone                  | 78-93-3             | 34           | 5                           | 14                        | 0.99            |
| 10950        | Carbon Disulfide            | 75-15-0             | 5 J          | 1                           | 7                         | 0.99            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Cyclohexane                 | 110-82-7            | 7            | 1                           | 7                         | 0.99            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Ethylbenzene                | 100-41-4            | 3 J          | 1                           | 7                         | 0.99            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 3                           | 14                        | 0.99            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 14                        | 0.99            |
| 10950        | Isopropylbenzene            | 98-82-8             | 4 J          | 1                           | 7                         | 0.99            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.7                         | 7                         | 0.99            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 14                        | 0.99            |
| 10950        | Methylcyclohexane           | 108-87-2            | 81           | 1                           | 7                         | 0.99            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Tetrachloroethene           | 127-18-4            | 3 J          | 1                           | 7                         | 0.99            |
| 10950        | Toluene                     | 108-88-3            | 5 J          | 1                           | 7                         | 0.99            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 3                           | 7                         | 0.99            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 7                         | 0.99            |
| 10950        | Xylene (Total)              | 1330-20-7           | 27           | 1                           | 7                         | 0.99            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-51\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-51\_0-2'

**LLI Sample #** SW 6262290  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 10:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

51-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 450 J        | 220                         | 1,100                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 330 J        | 220                         | 1,100                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 580 J        | 220                         | 1,100                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | 790 J        | 220                         | 1,100                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 670                         | 2,200                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,200                       | 6,700                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 450                         | 2,200                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 220                         | 1,100                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 960 J        | 220                         | 1,100                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 450                         | 1,100                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-51\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-51\_0-2'

LLI Sample # SW 6262290  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

51-02

| CAT No. | Analysis Name                                                                                                                                                                                               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Semivolatiles                                                                                                                                                                                               | SW-846 8270C | ug/kg      | ug/kg                       | ug/kg                     |                 |
|         | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |              |            |                             |                           |                 |
| 10727   | Naphthalene                                                                                                                                                                                                 | 91-20-3      | 240 J      | 220                         | 1,100                     | 5               |
| 10727   | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4      | N.D.       | 220                         | 1,100                     | 5               |
| 10727   | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2      | N.D.       | 450                         | 1,100                     | 5               |
| 10727   | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6     | N.D.       | 450                         | 1,100                     | 5               |
| 10727   | Nitrobenzene                                                                                                                                                                                                | 98-95-3      | N.D.       | 220                         | 1,100                     | 5               |
| 10727   | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5      | N.D.       | 220                         | 1,100                     | 5               |
| 10727   | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7     | N.D.       | 1,100                       | 3,400                     | 5               |
| 10727   | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7     | N.D.       | 220                         | 1,100                     | 5               |
| 10727   | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6      | N.D.       | 220                         | 1,100                     | 5               |
|         | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |              |            |                             |                           |                 |
| 10727   | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0     | N.D.       | 450                         | 1,100                     | 5               |
| 10727   | Pentachlorophenol                                                                                                                                                                                           | 87-86-5      | N.D.       | 1,100                       | 3,400                     | 5               |
| 10727   | Phenanthrene                                                                                                                                                                                                | 85-01-8      | 680 J      | 220                         | 1,100                     | 5               |
| 10727   | Phenol                                                                                                                                                                                                      | 108-95-2     | N.D.       | 220                         | 1,100                     | 5               |
| 10727   | Pyrene                                                                                                                                                                                                      | 129-00-0     | 590 J      | 220                         | 1,100                     | 5               |
| 10727   | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4      | N.D.       | 450                         | 1,100                     | 5               |
| 10727   | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2      | N.D.       | 220                         | 1,100                     | 5               |

Reporting limits were raised due to interference from the sample matrix.

The GC/MS semivolatile surrogate recoveries are outside of QC limits. The matrix spike sample was analyzed and surrogate recoveries are again outside of QC limits, indicating a matrix effect.

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 20,100       | 6.76         | 26.9  |
| 06944         | Antimony            | 7440-36-0    | 13.5         | 1.34         | 2.69  |
| 06935         | Arsenic             | 7440-38-2    | 21.3         | 1.28         | 2.69  |
| 06946         | Barium              | 7440-39-3    | 271          | 0.0537       | 0.672 |
| 06947         | Beryllium           | 7440-41-7    | 0.767        | 0.0913       | 0.672 |
| 06949         | Cadmium             | 7440-43-9    | 0.945        | 0.188        | 0.672 |
| 01650         | Calcium             | 7440-70-2    | 112,000      | 41.2         | 134   |
| 06951         | Chromium            | 7440-47-3    | 1,880        | 0.792        | 2.01  |
| 06952         | Cobalt              | 7440-48-4    | 10.2         | 0.255        | 0.672 |
| 06953         | Copper              | 7440-50-8    | 246          | 0.295        | 1.34  |
| 01654         | Iron                | 7439-89-6    | 23,400       | 6.33         | 26.9  |
| 06955         | Lead                | 7439-92-1    | 1,720        | 4.03         | 10.1  |
| 01657         | Magnesium           | 7439-95-4    | 43,400       | 3.41         | 13.4  |
| 06958         | Manganese           | 7439-96-5    | 602          | 0.105        | 0.672 |
| 06961         | Nickel              | 7440-02-0    | 100          | 0.255        | 1.34  |
| 01662         | Potassium           | 7440-09-7    | 874          | 24.2         | 67.2  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.32         | 2.69  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.242        | 0.672 |
| 01667         | Sodium              | 7440-23-5    | 323          | 50.1         | 134   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.95         | 4.03  |
| 06971         | Vanadium            | 7440-62-2    | 259          | 0.255        | 0.672 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-51\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-51\_0-2'

LLI Sample # SW 6262290  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

51-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 06972                                                                                                                                                                 | Zinc          | SW-846 6010B<br>7440-66-6 | mg/kg<br>893  | mg/kg<br>0.886              | mg/kg<br>2.69             | 1               |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>1.52 | mg/kg<br>0.0189             | mg/kg<br>0.659            | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>27.0     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 09:18       | Stephanie A Selis | 0.99            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 10:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 10:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 10:20       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 08:10       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:08       | Joanne M Gates    | 5               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:05       | Joanne M Gates    | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:08       | Joanne M Gates    | 5               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-51\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-51\_0-2'

LLI Sample # SW 6262290  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 10:20 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

51-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06936   | Selenium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 10:05       | Joanne M Gates   | 1               |
| 06966   | Silver              | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder    | 1               |
| 01667   | Sodium              | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder    | 1               |
| 06925   | Thallium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder    | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:46       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 11:34       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |





# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 5

**Sample Description:** BH-10-52\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-52\_0-2'

**LLI Sample #** SW 6262291  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 11:15 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/19/2011 14:50

PO Box 744

**Reported:** 05/05/2011 14:47

West Chester PA 19381

52-02

| CAT No. | Analysis Name               | CAS Number   | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------|-----------------------------|--------------|------------|-----------------------------|---------------------------|-----------------|
| GC/MS   | Volatiles                   | SW-846 8260B | ug/kg      | ug/kg                       | ug/kg                     |                 |
| 10950   | Acetone                     | 67-64-1      | 84         | 6                           | 18                        | 0.78            |
| 10950   | Benzene                     | 71-43-2      | 8          | 0.5                         | 5                         | 0.78            |
| 10950   | Bromodichloromethane        | 75-27-4      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Bromoform                   | 75-25-2      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Bromomethane                | 74-83-9      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | 2-Butanone                  | 78-93-3      | 8 J        | 4                           | 9                         | 0.78            |
| 10950   | Carbon Disulfide            | 75-15-0      | 2 J        | 0.9                         | 5                         | 0.78            |
| 10950   | Carbon Tetrachloride        | 56-23-5      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Chlorobenzene               | 108-90-7     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Chloroethane                | 75-00-3      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Chloroform                  | 67-66-3      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Chloromethane               | 74-87-3      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Cyclohexane                 | 110-82-7     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2-Dibromo-3-chloropropane | 96-12-8      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Dibromochloromethane        | 124-48-1     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2-Dibromoethane           | 106-93-4     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2-Dichlorobenzene         | 95-50-1      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,3-Dichlorobenzene         | 541-73-1     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,4-Dichlorobenzene         | 106-46-7     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Dichlorodifluoromethane     | 75-71-8      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | 1,1-Dichloroethane          | 75-34-3      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2-Dichloroethane          | 107-06-2     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,1-Dichloroethene          | 75-35-4      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | cis-1,2-Dichloroethene      | 156-59-2     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | trans-1,2-Dichloroethene    | 156-60-5     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2-Dichloropropane         | 78-87-5      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | cis-1,3-Dichloropropene     | 10061-01-5   | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | trans-1,3-Dichloropropene   | 10061-02-6   | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Ethylbenzene                | 100-41-4     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Freon 113                   | 76-13-1      | N.D.       | 2                           | 9                         | 0.78            |
| 10950   | 2-Hexanone                  | 591-78-6     | N.D.       | 3                           | 9                         | 0.78            |
| 10950   | Isopropylbenzene            | 98-82-8      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Methyl Acetate              | 79-20-9      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Methyl Tertiary Butyl Ether | 1634-04-4    | N.D.       | 0.5                         | 5                         | 0.78            |
| 10950   | 4-Methyl-2-pentanone        | 108-10-1     | N.D.       | 3                           | 9                         | 0.78            |
| 10950   | Methylcyclohexane           | 108-87-2     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Methylene Chloride          | 75-09-2      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Styrene                     | 100-42-5     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,1,2,2-Tetrachloroethane   | 79-34-5      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Tetrachloroethene           | 127-18-4     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Toluene                     | 108-88-3     | 3 J        | 0.9                         | 5                         | 0.78            |
| 10950   | 1,2,4-Trichlorobenzene      | 120-82-1     | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,1,1-Trichloroethane       | 71-55-6      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | 1,1,2-Trichloroethane       | 79-00-5      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Trichloroethene             | 79-01-6      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Trichlorofluoromethane      | 75-69-4      | N.D.       | 2                           | 5                         | 0.78            |
| 10950   | Vinyl Chloride              | 75-01-4      | N.D.       | 0.9                         | 5                         | 0.78            |
| 10950   | Xylene (Total)              | 1330-20-7    | 1 J        | 0.9                         | 5                         | 0.78            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-52\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-52\_0-2'

LLI Sample # SW 6262291  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

52-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 190                         | 970                       | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 390                         | 970                       | 5               |
| 10727        | Anthracene                   | 120-12-7            | 310 J        | 190                         | 970                       | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 190                         | 970                       | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 390                         | 970                       | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 610 J        | 190                         | 970                       | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 590 J        | 190                         | 970                       | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 680 J        | 190                         | 970                       | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 440 J        | 190                         | 970                       | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 350 J        | 190                         | 970                       | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 390                         | 970                       | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 390                         | 970                       | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 390                         | 970                       | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 390                         | 970                       | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 190                         | 970                       | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Chrysene                     | 218-01-9            | 650 J        | 190                         | 970                       | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 190                         | 970                       | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 190                         | 970                       | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 580                         | 1,900                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 390                         | 970                       | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 390                         | 970                       | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 390                         | 970                       | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 970                         | 2,900                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 1,900                       | 5,800                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 390                         | 970                       | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 190                         | 970                       | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 390                         | 1,900                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 1,100        | 190                         | 970                       | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 190                         | 970                       | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 190                         | 970                       | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 390                         | 970                       | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 970                         | 2,900                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 190                         | 970                       | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 350 J        | 190                         | 970                       | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 190                         | 970                       | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 390                         | 970                       | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 390                         | 970                       | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-52\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-52\_0-2'

**LLI Sample #** SW 6262291  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 11:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

52-02

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 190                         | 970                       | 5               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 190                         | 970                       | 5               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 390                         | 970                       | 5               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 390                         | 970                       | 5               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 190                         | 970                       | 5               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 190                         | 970                       | 5               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 970                         | 2,900                     | 5               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 190                         | 970                       | 5               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 190                         | 970                       | 5               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 390                         | 970                       | 5               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 970                         | 2,900                     | 5               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 1,100        | 190                         | 970                       | 5               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 190                         | 970                       | 5               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 980          | 190                         | 970                       | 5               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 390                         | 970                       | 5               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 190                         | 970                       | 5               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 12,600       | 5.79                        | 23.0                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.15                        | 2.30                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 12.2         | 1.09                        | 2.30                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 174          | 0.0461                      | 0.576                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 0.649        | 0.0783                      | 0.576                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | 0.238        | 0.161                       | 0.576                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 9,200        | 7.06                        | 23.0                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 52.0         | 0.680                       | 1.73                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 7.07         | 0.219                       | 0.576                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 79.3         | 0.253                       | 1.15                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 19,800       | 5.43                        | 23.0                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 1,480        | 3.46                        | 8.64                      | 5               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 4,510        | 2.93                        | 11.5                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 276          | 0.0899                      | 0.576                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 24.9         | 0.219                       | 1.15                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,520        | 20.7                        | 57.6                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.13                        | 2.30                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.207                       | 0.576                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 107          | 43.0                        | 115                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 1.67                        | 3.46                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 51.6         | 0.219                       | 0.576                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 177          | 0.760                       | 2.30                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-52\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-52\_0-2'

**LLI Sample #** SW 6262291  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

52-02

| CAT No.              | Analysis Name                                                                                                                                                         | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>        |                                                                                                                                                                       |            |            |                             |                           |                 |
| 00159                | Mercury                                                                                                                                                               | 7439-97-6  | mg/kg      | mg/kg                       | mg/kg                     | 1               |
|                      |                                                                                                                                                                       |            | 0.715      | 0.0034                      | 0.117                     |                 |
| <b>Wet Chemistry</b> |                                                                                                                                                                       |            |            |                             |                           |                 |
| 00111                | Moisture                                                                                                                                                              | n.a.       | %          | %                           | %                         | 1               |
|                      |                                                                                                                                                                       |            | 14.9       | 0.50                        | 0.50                      |                 |
|                      | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111151AA    | 04/25/2011 21:55       | Sara E Johnson    | 0.78            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 11:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 11:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 11:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 09:25       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:15       | Joanne M Gates    | 5               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:12       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-52\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-52\_0-2'

LLI Sample # SW 6262291  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 11:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

52-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:50       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:25       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-68\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-68\_0-2'

LLI Sample # SW 6262292  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 13:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

68-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 87           | 6                           | 18                        | 0.74            |
| 10950        | Benzene                     | 71-43-2             | 3 J          | 0.4                         | 4                         | 0.74            |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 2-Butanone                  | 78-93-3             | 9            | 4                           | 9                         | 0.74            |
| 10950        | Carbon Disulfide            | 75-15-0             | 4 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 2                           | 9                         | 0.74            |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.4                         | 4                         | 0.74            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 3                           | 9                         | 0.74            |
| 10950        | Methylcyclohexane           | 108-87-2            | 2 J          | 0.9                         | 4                         | 0.74            |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 2                           | 4                         | 0.74            |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 0.9                         | 4                         | 0.74            |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 0.9                         | 4                         | 0.74            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-68\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-68\_0-2'

LLI Sample # SW 6262292  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 13:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

68-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 390                         | 980                       | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 590                         | 2,000                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,000                       | 5,900                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 390                         | 980                       | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 200                         | 980                       | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 390                         | 2,000                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 390                         | 980                       | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 200                         | 980                       | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 390                         | 980                       | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-68\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-68\_0-2'

LLI Sample # SW 6262292  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 13:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

68-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 200                         | 980                       | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 200                         | 980                       | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 200                         | 980                       | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 390                         | 980                       | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 980                         | 2,900                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 200                         | 980                       | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | 1,300        | 200                         | 980                       | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 200                         | 980                       | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 390                         | 980                       | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 200                         | 980                       | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

| Metals |           | SW-846 6010B | mg/kg  | mg/kg  | mg/kg |   |
|--------|-----------|--------------|--------|--------|-------|---|
| 01643  | Aluminum  | 7429-90-5    | 22,600 | 5.70   | 22.7  | 1 |
| 06944  | Antimony  | 7440-36-0    | N.D.   | 1.13   | 2.27  | 1 |
| 06935  | Arsenic   | 7440-38-2    | 7.99   | 1.08   | 2.27  | 1 |
| 06946  | Barium    | 7440-39-3    | 135    | 0.0454 | 0.567 | 1 |
| 06947  | Beryllium | 7440-41-7    | 1.11   | 0.0771 | 0.567 | 1 |
| 06949  | Cadmium   | 7440-43-9    | N.D.   | 0.159  | 0.567 | 1 |
| 01650  | Calcium   | 7440-70-2    | 25,900 | 6.95   | 22.7  | 1 |
| 06951  | Chromium  | 7440-47-3    | 142    | 0.669  | 1.70  | 1 |
| 06952  | Cobalt    | 7440-48-4    | 9.00   | 0.215  | 0.567 | 1 |
| 06953  | Copper    | 7440-50-8    | 41.2   | 0.249  | 1.13  | 1 |
| 01654  | Iron      | 7439-89-6    | 30,000 | 5.34   | 22.7  | 1 |
| 06955  | Lead      | 7439-92-1    | 94.2   | 0.680  | 1.70  | 1 |
| 01657  | Magnesium | 7439-95-4    | 13,800 | 2.88   | 11.3  | 1 |
| 06958  | Manganese | 7439-96-5    | 777    | 0.0884 | 0.567 | 1 |
| 06961  | Nickel    | 7440-02-0    | 30.2   | 0.215  | 1.13  | 1 |
| 01662  | Potassium | 7440-09-7    | 1,050  | 20.4   | 56.7  | 1 |
| 06936  | Selenium  | 7782-49-2    | N.D.   | 1.11   | 2.27  | 1 |
| 06966  | Silver    | 7440-22-4    | N.D.   | 0.204  | 0.567 | 1 |
| 01667  | Sodium    | 7440-23-5    | 88.4   | 42.3   | 113   | 1 |
| 06925  | Thallium  | 7440-28-0    | N.D.   | 1.64   | 3.40  | 1 |
| 06971  | Vanadium  | 7440-62-2    | 60.8   | 0.215  | 0.567 | 1 |
| 06972  | Zinc      | 7440-66-6    | 115    | 0.748  | 2.27  | 1 |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-68\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-68\_0-2'

**LLI Sample #** SW 6262292  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

68-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.335 | mg/kg<br>0.0032             | mg/kg<br>0.112            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>16.0      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 05:10       | Stephanie A Selis | 0.74            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 13:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 13:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 13:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 09:50       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:18       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-68\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-68\_0-2'

**LLI Sample #** SW 6262292  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

68-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:53       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:26       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-65\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_0-2

LLI Sample # SW 6262293  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 360          | 10                          | 28                        | 1               |
| 10950        | Benzene                     | 71-43-2             | 33           | 0.7                         | 7                         | 1               |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 3                           | 7                         | 1               |
| 10950        | 2-Butanone                  | 78-93-3             | 48           | 6                           | 14                        | 1               |
| 10950        | Carbon Disulfide            | 75-15-0             | 5 J          | 1                           | 7                         | 1               |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 1                           | 7                         | 1               |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Cyclohexane                 | 110-82-7            | 9            | 1                           | 7                         | 1               |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 1                           | 7                         | 1               |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 3                           | 7                         | 1               |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 1                           | 7                         | 1               |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 1                           | 7                         | 1               |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 1                           | 7                         | 1               |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 1                           | 7                         | 1               |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 1                           | 7                         | 1               |
| 10950        | Ethylbenzene                | 100-41-4            | 2 J          | 1                           | 7                         | 1               |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 3                           | 14                        | 1               |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 4                           | 14                        | 1               |
| 10950        | Isopropylbenzene            | 98-82-8             | 2 J          | 1                           | 7                         | 1               |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.7                         | 7                         | 1               |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 4                           | 14                        | 1               |
| 10950        | Methylcyclohexane           | 108-87-2            | 28           | 1                           | 7                         | 1               |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 1                           | 7                         | 1               |
| 10950        | Toluene                     | 108-88-3            | 8            | 1                           | 7                         | 1               |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 1                           | 7                         | 1               |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 3                           | 7                         | 1               |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 1                           | 7                         | 1               |
| 10950        | Xylene (Total)              | 1330-20-7           | 12           | 1                           | 7                         | 1               |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_0-2

**LLI Sample #** SW 6262293  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
|              | was confirmed.               |                     |              |                             |                           |                 |
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 680                         | 2,300                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 2,300                       | 6,800                     | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 450                         | 2,300                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 410          | 230                         | 1,100                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 450                         | 1,100                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_0-2

**LLI Sample #** SW 6262293  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 230                         | 1,100                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,100                       | 3,400                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 230                         | 1,100                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 450                         | 1,100                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 230                         | 1,100                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |       |
|---------------|---------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum            | 7429-90-5    | 13,100       | 6.92         | 27.5  |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 1.38         | 2.75  |
| 06935         | Arsenic             | 7440-38-2    | 8.71         | 1.31         | 2.75  |
| 06946         | Barium              | 7440-39-3    | 170          | 0.0550       | 0.688 |
| 06947         | Beryllium           | 7440-41-7    | 0.503 J      | 0.0935       | 0.688 |
| 06949         | Cadmium             | 7440-43-9    | 0.403 J      | 0.193        | 0.688 |
| 01650         | Calcium             | 7440-70-2    | 20,200       | 8.43         | 27.5  |
| 06951         | Chromium            | 7440-47-3    | 27.0         | 0.812        | 2.06  |
| 06952         | Cobalt              | 7440-48-4    | 5.34         | 0.261        | 0.688 |
| 06953         | Copper              | 7440-50-8    | 86.7         | 0.303        | 1.38  |
| 01654         | Iron                | 7439-89-6    | 14,900       | 6.48         | 27.5  |
| 06955         | Lead                | 7439-92-1    | 307          | 0.825        | 2.06  |
| 01657         | Magnesium           | 7439-95-4    | 11,200       | 3.49         | 13.8  |
| 06958         | Manganese           | 7439-96-5    | 382          | 0.107        | 0.688 |
| 06961         | Nickel              | 7440-02-0    | 24.1         | 0.261        | 1.38  |
| 01662         | Potassium           | 7440-09-7    | 836          | 24.8         | 68.8  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 1.35         | 2.75  |
| 06966         | Silver              | 7440-22-4    | N.D.         | 0.248        | 0.688 |
| 01667         | Sodium              | 7440-23-5    | 99.3 J       | 51.3         | 138   |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 1.99         | 4.13  |
| 06971         | Vanadium            | 7440-62-2    | 48.8         | 0.261        | 0.688 |
| 06972         | Zinc                | 7440-66-6    | 181          | 0.908        | 2.75  |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_0-2

**LLI Sample #** SW 6262293  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

65-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result     | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|----------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>0.648 | mg/kg<br>0.0038             | mg/kg<br>0.133            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>27.3      | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 05:32       | Stephanie A Selis | 1               |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 14:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 14:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 14:15       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 10:16       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:22       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_0-2

**LLI Sample #** SW 6262293  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 14:15 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

65-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 02:57       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 10:28       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |



**Sample Description:** BH-10-58\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-58\_0-2'

**LLI Sample #** SW 6262294  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

58-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 1,400                       | 4,000                     | 91.09           |
| 10950        | Benzene                     | 71-43-2             | N.D.         | 99                          | 990                       | 91.09           |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 790                         | 2,000                     | 91.09           |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | Cyclohexane                 | 110-82-7            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 400                         | 2,000                     | 91.09           |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 590                         | 2,000                     | 91.09           |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Methyl Acetate              | 79-20-9             | 1,700        | 400                         | 990                       | 91.09           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 99                          | 990                       | 91.09           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 590                         | 2,000                     | 91.09           |
| 10950        | Methylcyclohexane           | 108-87-2            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 400                         | 990                       | 91.09           |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 200                         | 990                       | 91.09           |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 200                         | 990                       | 91.09           |

Reporting limits were raised due to interference from the sample matrix.

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-58\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-58\_0-2'

**LLI Sample #** SW 6262294  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

58-02

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Chrysene                     | 218-01-9            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 1,100                       | 3,600                     | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 1,800                       | 5,400                     | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 3,600                       | 11,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 720                         | 3,600                     | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 1,800                       | 5,400                     | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 820 J        | 360                         | 1,800                     | 5               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 720                         | 1,800                     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-58\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-58\_0-2'

LLI Sample # SW 6262294  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:20 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

58-02

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 400 J        | 360                         | 1,800                     | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 1,800                       | 5,400                     | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 360                         | 1,800                     | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 1,800                       | 5,400                     | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | N.D.         | 360                         | 1,800                     | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 720                         | 1,800                     | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 360                         | 1,800                     | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                     |              |              |              |      |
|---------------|---------------------|--------------|--------------|--------------|------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |      |
| 01643         | Aluminum            | 7429-90-5    | 24,900       | 10.9         | 43.5 |
| 06944         | Antimony            | 7440-36-0    | N.D.         | 2.17         | 4.35 |
| 06935         | Arsenic             | 7440-38-2    | 18.6         | 2.07         | 4.35 |
| 06946         | Barium              | 7440-39-3    | 735          | 0.0870       | 1.09 |
| 06947         | Beryllium           | 7440-41-7    | 0.724 J      | 0.148        | 1.09 |
| 06949         | Cadmium             | 7440-43-9    | 1.26         | 0.304        | 1.09 |
| 01650         | Calcium             | 7440-70-2    | 48,000       | 13.3         | 43.5 |
| 06951         | Chromium            | 7440-47-3    | 57.3         | 1.28         | 3.26 |
| 06952         | Cobalt              | 7440-48-4    | 11.3         | 0.413        | 1.09 |
| 06953         | Copper              | 7440-50-8    | 363          | 0.478        | 2.17 |
| 01654         | Iron                | 7439-89-6    | 28,900       | 10.2         | 43.5 |
| 06955         | Lead                | 7439-92-1    | 941          | 1.30         | 3.26 |
| 01657         | Magnesium           | 7439-95-4    | 33,200       | 5.52         | 21.7 |
| 06958         | Manganese           | 7439-96-5    | 730          | 0.170        | 1.09 |
| 06961         | Nickel              | 7440-02-0    | 61.6         | 0.413        | 2.17 |
| 01662         | Potassium           | 7440-09-7    | 990          | 39.1         | 109  |
| 06936         | Selenium            | 7782-49-2    | N.D.         | 2.13         | 4.35 |
| 06966         | Silver              | 7440-22-4    | 0.580 J      | 0.391        | 1.09 |
| 01667         | Sodium              | 7440-23-5    | 212 J        | 81.1         | 217  |
| 06925         | Thallium            | 7440-28-0    | N.D.         | 3.15         | 6.52 |
| 06971         | Vanadium            | 7440-62-2    | 100          | 0.413        | 1.09 |
| 06972         | Zinc                | 7440-66-6    | 431          | 1.43         | 4.35 |

**SW-846 7471A** **mg/kg** **mg/kg** **mg/kg**

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-58\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-58\_0-2'

**LLI Sample #** SW 6262294  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:20 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

58-02

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |            |            |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | 7439-97-6  | mg/kg      | mg/kg                       | mg/kg                     |                 |
|                                                                                                                                                                       |               |            | 4.82       | 0.0295                      | 1.03                      | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |            |            |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | n.a.       | %          | %                           | %                         |                 |
|                                                                                                                                                                       |               |            | 54.0       | 0.50                        | 0.50                      | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111161AA    | 04/26/2011 10:33       | Stephanie A Selis | 91.09           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 15:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 15:20       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 15:20       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 10:41       | Brian K Graham    | 5               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:32       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 5 of 5

**Sample Description:** BH-10-58\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-58\_0-2'

**LLI Sample #** SW 6262294  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 15:20 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

58-02

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 03:00       | Tara L Snyder    | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 11:36       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-65\_6-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_6-8'

LLI Sample # SW 6262295  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-68

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | N.D.         | 1,300                       | 3,700                     | 126.65          |
| 10950        | Benzene                     | 71-43-2             | 35,000       | 92                          | 920                       | 126.65          |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | 2-Butanone                  | 78-93-3             | N.D.         | 730                         | 1,800                     | 126.65          |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | Cyclohexane                 | 110-82-7            | 6,700        | 180                         | 920                       | 126.65          |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Ethylbenzene                | 100-41-4            | 7,500        | 180                         | 920                       | 126.65          |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 370                         | 1,800                     | 126.65          |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 550                         | 1,800                     | 126.65          |
| 10950        | Isopropylbenzene            | 98-82-8             | 5,100        | 180                         | 920                       | 126.65          |
| 10950        | Methyl Acetate              | 79-20-9             | 910          | 370                         | 920                       | 126.65          |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 92                          | 920                       | 126.65          |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 550                         | 1,800                     | 126.65          |
| 10950        | Methylcyclohexane           | 108-87-2            | 26,000       | 180                         | 920                       | 126.65          |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Toluene                     | 108-88-3            | 5,800        | 180                         | 920                       | 126.65          |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 370                         | 920                       | 126.65          |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 180                         | 920                       | 126.65          |
| 10950        | Xylene (Total)              | 1330-20-7           | 57,000       | 180                         | 920                       | 126.65          |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_6-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_6-8'

**LLI Sample #** SW 6262295  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-68

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | 15,000       | 2,400                       | 12,000                    | 5               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Anthracene                   | 120-12-7            | 7,800        | J 2,400                     | 12,000                    | 5               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | 7,200        | J 2,400                     | 12,000                    | 5               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | 5,700        | J 2,400                     | 12,000                    | 5               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | 6,100        | J 2,400                     | 12,000                    | 5               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | 5,200        | J 2,400                     | 12,000                    | 5               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | 2,600        | J 2,400                     | 12,000                    | 5               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | 26,000       | 2,400                       | 12,000                    | 5               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Chrysene                     | 218-01-9            | 14,000       | 2,400                       | 12,000                    | 5               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Dibenzofuran                 | 132-64-9            | 14,000       | 2,400                       | 12,000                    | 5               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 7,200                       | 24,000                    | 5               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 12,000                      | 36,000                    | 5               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 24,000                      | 72,000                    | 5               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 4,800                       | 24,000                    | 5               |
| 10727        | Fluoranthene                 | 206-44-0            | 10,000       | J 2,400                     | 12,000                    | 5               |
| 10727        | Fluorene                     | 86-73-7             | 24,000       | 2,400                       | 12,000                    | 5               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 12,000                      | 36,000                    | 5               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | 3,400        | J 2,400                     | 12,000                    | 5               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 280,000      | 24,000                      | 120,000                   | 50              |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 4,800                       | 12,000                    | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_6-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_6-8'

**LLI Sample #** SW 6262295  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

65-68

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 110,000      | 2,400                       | 12,000                    | 5               |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 12,000                      | 36,000                    | 5               |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 2,400                       | 12,000                    | 5               |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 12,000                      | 36,000                    | 5               |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 55,000       | 2,400                       | 12,000                    | 5               |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 2,400                       | 12,000                    | 5               |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | 17,000       | 2,400                       | 12,000                    | 5               |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 4,800                       | 12,000                    | 5               |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 2,400                       | 12,000                    | 5               |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                             |                           |                 |

|               |                                                                          |              |              |              |       |
|---------------|--------------------------------------------------------------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b>                                                      | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 01643         | Aluminum                                                                 | 7429-90-5    | 10,200       | 7.29         | 29.0  |
| 06944         | Antimony                                                                 | 7440-36-0    | 4.55         | 1.45         | 2.90  |
| 06935         | Arsenic                                                                  | 7440-38-2    | 28.3         | 1.38         | 2.90  |
| 06946         | Barium                                                                   | 7440-39-3    | 508          | 0.0580       | 0.725 |
| 06947         | Beryllium                                                                | 7440-41-7    | 0.490 J      | 0.0986       | 0.725 |
| 06949         | Cadmium                                                                  | 7440-43-9    | 1.05         | 0.203        | 0.725 |
| 01650         | Calcium                                                                  | 7440-70-2    | 12,100       | 8.88         | 29.0  |
| 06951         | Chromium                                                                 | 7440-47-3    | 163          | 0.855        | 2.17  |
| 06952         | Cobalt                                                                   | 7440-48-4    | 27.7         | 0.275        | 0.725 |
| 06953         | Copper                                                                   | 7440-50-8    | 684          | 0.319        | 1.45  |
| 01654         | Iron                                                                     | 7439-89-6    | 77,000       | 68.3         | 290   |
| 06955         | Lead                                                                     | 7439-92-1    | 1,500        | 4.35         | 10.9  |
| 01657         | Magnesium                                                                | 7439-95-4    | 55,100       | 3.68         | 14.5  |
| 06958         | Manganese                                                                | 7439-96-5    | 639          | 0.113        | 0.725 |
| 06961         | Nickel                                                                   | 7440-02-0    | 332          | 0.275        | 1.45  |
| 01662         | Potassium                                                                | 7440-09-7    | 1,020        | 26.1         | 72.5  |
| 06936         | Selenium                                                                 | 7782-49-2    | N.D.         | 7.10         | 14.5  |
|               | Reporting limits were raised due to interference from the sample matrix. |              |              |              |       |
| 06966         | Silver                                                                   | 7440-22-4    | 0.299 J      | 0.261        | 0.725 |
| 01667         | Sodium                                                                   | 7440-23-5    | 328          | 54.1         | 145   |
| 06925         | Thallium                                                                 | 7440-28-0    | 2.32 J       | 2.10         | 4.35  |
| 06971         | Vanadium                                                                 | 7440-62-2    | 95.6         | 0.275        | 0.725 |
| 06972         | Zinc                                                                     | 7440-66-6    | 2,550        | 4.78         | 14.5  |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_6-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_6-8'

**LLI Sample #** SW 6262295  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

65-68

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result    | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|---------------|-----------------------------|---------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |               |                             |                           |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>1.29 | mg/kg<br>0.0199             | mg/kg<br>0.695            | 5               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |               |                             |                           |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>31.0     | %<br>0.50                   | %<br>0.50                 | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |               |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111121AA    | 04/22/2011 13:57       | Stephanie A Selis | 126.65          |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 14:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 14:30       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/25/2011 11:06       | Brian K Graham    | 5               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/26/2011 02:34       | Brian K Graham    | 50              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/29/2011 04:59       | Tara L Snyder     | 10              |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:39       | Joanne M Gates    | 5               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 10:39       | Joanne M Gates    | 5               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_6-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_6-8'

**LLI Sample #** SW 6262295  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 14:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

65-68

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder    | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 03:04       | Tara L Snyder    | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111125708004 | 04/28/2011 10:39       | Joanne M Gates   | 5               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111125711004 | 04/25/2011 11:37       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |



**Sample Description:** BH-10-65\_14-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_14-16'

LLI Sample # SW 6262296  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/19/2011 14:50

PO Box 744

Reported: 05/05/2011 14:47

West Chester PA 19381

65-14

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Acetone                     | 67-64-1             | 160          | 11                          | 31                        | 1               |
| 10950        | Benzene                     | 71-43-2             | 2 J          | 0.8                         | 8                         | 1               |
| 10950        | Bromodichloromethane        | 75-27-4             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Bromoform                   | 75-25-2             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Bromomethane                | 74-83-9             | N.D.         | 3                           | 8                         | 1               |
| 10950        | 2-Butanone                  | 78-93-3             | 27           | 6                           | 15                        | 1               |
| 10950        | Carbon Disulfide            | 75-15-0             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Carbon Tetrachloride        | 56-23-5             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Chlorobenzene               | 108-90-7            | N.D.         | 2                           | 8                         | 1               |
| 10950        | Chloroethane                | 75-00-3             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Chloroform                  | 67-66-3             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Chloromethane               | 74-87-3             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Cyclohexane                 | 110-82-7            | 71           | 2                           | 8                         | 1               |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Dibromochloromethane        | 124-48-1            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | N.D.         | 2                           | 8                         | 1               |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | N.D.         | 3                           | 8                         | 1               |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | N.D.         | 2                           | 8                         | 1               |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | N.D.         | 2                           | 8                         | 1               |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | N.D.         | 2                           | 8                         | 1               |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | N.D.         | 2                           | 8                         | 1               |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | N.D.         | 2                           | 8                         | 1               |
| 10950        | Ethylbenzene                | 100-41-4            | 2 J          | 2                           | 8                         | 1               |
| 10950        | Freon 113                   | 76-13-1             | N.D.         | 3                           | 15                        | 1               |
| 10950        | 2-Hexanone                  | 591-78-6            | N.D.         | 5                           | 15                        | 1               |
| 10950        | Isopropylbenzene            | 98-82-8             | 7 J          | 2                           | 8                         | 1               |
| 10950        | Methyl Acetate              | 79-20-9             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.8                         | 8                         | 1               |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | N.D.         | 5                           | 15                        | 1               |
| 10950        | Methylcyclohexane           | 108-87-2            | 350          | 2                           | 8                         | 1               |
| 10950        | Methylene Chloride          | 75-09-2             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Styrene                     | 100-42-5            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Tetrachloroethene           | 127-18-4            | N.D.         | 2                           | 8                         | 1               |
| 10950        | Toluene                     | 108-88-3            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | N.D.         | 2                           | 8                         | 1               |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Trichloroethene             | 79-01-6             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Trichlorofluoromethane      | 75-69-4             | N.D.         | 3                           | 8                         | 1               |
| 10950        | Vinyl Chloride              | 75-01-4             | N.D.         | 2                           | 8                         | 1               |
| 10950        | Xylene (Total)              | 1330-20-7           | 13           | 2                           | 8                         | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_14-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_14-16'

LLI Sample # SW 6262296  
LLI Group # 1242848  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

65-14

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10727        | Acenaphthene                 | 83-32-9             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Acetophenone                 | 98-86-2             | N.D.         | 100                         | 250                       | 1               |
| 10727        | Anthracene                   | 120-12-7            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Atrazine                     | 1912-24-9           | N.D.         | 50                          | 250                       | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | N.D.         | 100                         | 250                       | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | N.D.         | 50                          | 250                       | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | N.D.         | 50                          | 250                       | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | N.D.         | 100                         | 250                       | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | N.D.         | 100                         | 250                       | 1               |
| 10727        | Caprolactam                  | 105-60-2            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Carbazole                    | 86-74-8             | N.D.         | 50                          | 250                       | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | N.D.         | 100                         | 250                       | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | N.D.         | 100                         | 250                       | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | N.D.         | 50                          | 250                       | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | N.D.         | 50                          | 250                       | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | N.D.         | 50                          | 250                       | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | N.D.         | 50                          | 250                       | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | N.D.         | 50                          | 250                       | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Chrysene                     | 218-01-9            | 56           | J 50                        | 250                       | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | N.D.         | 50                          | 250                       | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | N.D.         | 150                         | 500                       | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | N.D.         | 100                         | 250                       | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | N.D.         | 100                         | 250                       | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | N.D.         | 100                         | 250                       | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | N.D.         | 250                         | 760                       | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | N.D.         | 500                         | 1,500                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | N.D.         | 100                         | 250                       | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | N.D.         | 50                          | 250                       | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | N.D.         | 100                         | 500                       | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | 54           | J 50                        | 250                       | 1               |
| 10727        | Fluorene                     | 86-73-7             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | N.D.         | 100                         | 250                       | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | N.D.         | 250                         | 760                       | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | N.D.         | 50                          | 250                       | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | N.D.         | 50                          | 250                       | 1               |
| 10727        | Isophorone                   | 78-59-1             | N.D.         | 50                          | 250                       | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 160          | J 50                        | 250                       | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | N.D.         | 100                         | 250                       | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | N.D.         | 100                         | 250                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_14-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_14-16'

**LLI Sample #** SW 6262296  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/19/2011 14:50

Reported: 05/05/2011 14:47

65-14

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                             |                           |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | 63 J         | 50                          | 250                       | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | N.D.         | 50                          | 250                       | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | N.D.         | 100                         | 250                       | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | N.D.         | 100                         | 250                       | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | N.D.         | 50                          | 250                       | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | N.D.         | 50                          | 250                       | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | N.D.         | 250                         | 760                       | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | N.D.         | 50                          | 250                       | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | N.D.         | 50                          | 250                       | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                             |                           |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | N.D.         | 100                         | 250                       | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | N.D.         | 250                         | 760                       | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 130 J        | 50                          | 250                       | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | N.D.         | 50                          | 250                       | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | 83 J         | 50                          | 250                       | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | N.D.         | 100                         | 250                       | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | N.D.         | 50                          | 250                       | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 25,000       | 7.56                        | 30.1                      | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | N.D.         | 1.50                        | 3.01                      | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | 6.82         | 1.43                        | 3.01                      | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 324          | 0.0601                      | 0.752                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 1.12         | 0.102                       | 0.752                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | N.D.         | 0.211                       | 0.752                     | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 4,350        | 9.22                        | 30.1                      | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 51.9         | 0.887                       | 2.26                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 12.0         | 0.286                       | 0.752                     | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 13.1         | 0.331                       | 1.50                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 29,100       | 7.08                        | 30.1                      | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 291          | 0.902                       | 2.26                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 7,020        | 3.82                        | 15.0                      | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 352          | 0.117                       | 0.752                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 29.7         | 0.286                       | 1.50                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 2,320        | 27.1                        | 75.2                      | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | N.D.         | 1.47                        | 3.01                      | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | N.D.         | 0.271                       | 0.752                     | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 272          | 56.1                        | 150                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | N.D.         | 2.18                        | 4.51                      | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 55.8         | 0.286                       | 0.752                     | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 91.9         | 0.992                       | 3.01                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>                | <b>mg/kg</b>              |                 |
| 00159         | Mercury                                                                                                                                                                                                     | 7439-97-6           | 0.0844 J     | 0.0041                      | 0.143                     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_14-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_14-16'

**LLI Sample #** SW 6262296  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/14/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/19/2011 14:50

West Chester PA 19381

Reported: 05/05/2011 14:47

65-14

| CAT No.              | Analysis Name                                                                                                                                                         | CAS Number | Dry Result | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------------|---------------------------|-----------------|
| <b>Wet Chemistry</b> |                                                                                                                                                                       |            |            |                             |                           |                 |
|                      | <b>SM20 2540 G</b>                                                                                                                                                    |            | <b>%</b>   | <b>%</b>                    | <b>%</b>                  |                 |
| 00111                | Moisture                                                                                                                                                              | n.a.       | 34.8       | 0.50                        | 0.50                      | 1               |
|                      | "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |            |            |                             |                           |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111131AA    | 04/23/2011 09:41       | Stephanie A Selis | 1               |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201111024168 | 04/14/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201111024168 | 04/14/2011 15:00       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201111024168 | 04/14/2011 15:00       | Client Supplied   | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11111SLA026  | 04/26/2011 02:59       | Brian K Graham    | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11111SLA026  | 04/22/2011 09:00       | Kerrie A Freeburn | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 12:42       | Joanne M Gates    | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06925   | Thallium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06971   | Vanadium                       | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 06972   | Zinc                           | SW-846 6010B | 1      | 111125708004 | 04/28/2011 03:07       | Tara L Snyder     | 1               |
| 00159   | Mercury                        | SW-846 7471A | 1      | 111125711004 | 04/25/2011 10:32       | Damary Valentin   | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-65\_14-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259438 BH-10-65\_14-16'

**LLI Sample #** SW 6262296  
**LLI Group #** 1242848  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/14/2011 15:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/19/2011 14:50

West Chester PA 19381

**Reported:** 05/05/2011 14:47

65-14

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## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111125708004 | 04/23/2011 10:17       | James L Mertz    | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111125711004 | 04/23/2011 12:05       | James L Mertz    | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11112820001B | 04/22/2011 18:08       | Scott W Freisher | 1               |



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                                                                                                                             | Blank Result | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: Q111121AA                                                                                                                                   |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6262261-6262262, 6262264, 6262266-6262268, 6262270-6262271, 6262273-6262274, 6262276-6262277, 6262279-6262280, 6262282-6262283, 6262295 |              |             |           |              |          |           |                 |     |         |
| Acetone                                                                                                                                                   | N.D.         | 350.        | 1,000     | ug/kg        | 136      | 129       | 32-209          | 5   | 30      |
| Benzene                                                                                                                                                   | N.D.         | 25.         | 250       | ug/kg        | 115      | 115       | 80-120          | 0   | 30      |
| Bromodichloromethane                                                                                                                                      | N.D.         | 50.         | 250       | ug/kg        | 106      | 105       | 78-120          | 1   | 30      |
| Bromoform                                                                                                                                                 | N.D.         | 50.         | 250       | ug/kg        | 84       | 87        | 70-120          | 3   | 30      |
| Bromomethane                                                                                                                                              | N.D.         | 100.        | 250       | ug/kg        | 120      | 118       | 32-162          | 2   | 30      |
| 2-Butanone                                                                                                                                                | N.D.         | 200.        | 500       | ug/kg        | 109      | 110       | 46-153          | 0   | 30      |
| Carbon Disulfide                                                                                                                                          | N.D.         | 50.         | 250       | ug/kg        | 117      | 115       | 67-122          | 2   | 30      |
| Carbon Tetrachloride                                                                                                                                      | N.D.         | 50.         | 250       | ug/kg        | 107      | 110       | 69-122          | 2   | 30      |
| Chlorobenzene                                                                                                                                             | N.D.         | 50.         | 250       | ug/kg        | 98       | 99        | 80-120          | 1   | 30      |
| Chloroethane                                                                                                                                              | N.D.         | 100.        | 250       | ug/kg        | 126      | 166*      | 37-154          | 27  | 30      |
| Chloroform                                                                                                                                                | N.D.         | 50.         | 250       | ug/kg        | 109      | 109       | 80-120          | 1   | 30      |
| Chloromethane                                                                                                                                             | N.D.         | 100.        | 250       | ug/kg        | 102      | 100       | 54-132          | 1   | 30      |
| Cyclohexane                                                                                                                                               | N.D.         | 50.         | 250       | ug/kg        | 101      | 102       | 62-121          | 0   | 30      |
| 1,2-Dibromo-3-chloropropane                                                                                                                               | N.D.         | 100.        | 250       | ug/kg        | 65       | 69        | 58-120          | 6   | 30      |
| Dibromochloromethane                                                                                                                                      | N.D.         | 50.         | 250       | ug/kg        | 94       | 95        | 77-120          | 1   | 30      |
| 1,2-Dibromoethane                                                                                                                                         | N.D.         | 50.         | 250       | ug/kg        | 94       | 98        | 80-120          | 4   | 30      |
| 1,2-Dichlorobenzene                                                                                                                                       | N.D.         | 50.         | 250       | ug/kg        | 93       | 91        | 79-120          | 1   | 30      |
| 1,3-Dichlorobenzene                                                                                                                                       | N.D.         | 50.         | 250       | ug/kg        | 95       | 94        | 78-120          | 1   | 30      |
| 1,4-Dichlorobenzene                                                                                                                                       | N.D.         | 50.         | 250       | ug/kg        | 94       | 92        | 79-120          | 1   | 30      |
| Dichlorodifluoromethane                                                                                                                                   | N.D.         | 100.        | 250       | ug/kg        | 65       | 68        | 20-120          | 4   | 30      |
| 1,1-Dichloroethane                                                                                                                                        | N.D.         | 50.         | 250       | ug/kg        | 113      | 111       | 80-120          | 2   | 30      |
| 1,2-Dichloroethane                                                                                                                                        | N.D.         | 50.         | 250       | ug/kg        | 106      | 108       | 71-129          | 2   | 30      |
| 1,1-Dichloroethene                                                                                                                                        | N.D.         | 50.         | 250       | ug/kg        | 118      | 119       | 73-123          | 1   | 30      |
| cis-1,2-Dichloroethene                                                                                                                                    | N.D.         | 50.         | 250       | ug/kg        | 112      | 112       | 80-120          | 0   | 30      |
| trans-1,2-Dichloroethene                                                                                                                                  | N.D.         | 50.         | 250       | ug/kg        | 115      | 116       | 79-120          | 1   | 30      |
| 1,2-Dichloropropane                                                                                                                                       | N.D.         | 50.         | 250       | ug/kg        | 110      | 110       | 80-120          | 1   | 30      |
| cis-1,3-Dichloropropene                                                                                                                                   | N.D.         | 50.         | 250       | ug/kg        | 107      | 108       | 80-120          | 0   | 30      |
| trans-1,3-Dichloropropene                                                                                                                                 | N.D.         | 50.         | 250       | ug/kg        | 91       | 92        | 77-120          | 2   | 30      |
| Ethylbenzene                                                                                                                                              | N.D.         | 50.         | 250       | ug/kg        | 98       | 99        | 80-120          | 1   | 30      |
| Freon 113                                                                                                                                                 | N.D.         | 100.        | 500       | ug/kg        | 104      | 102       | 61-126          | 2   | 30      |
| 2-Hexanone                                                                                                                                                | N.D.         | 150.        | 500       | ug/kg        | 73       | 76        | 45-155          | 3   | 30      |
| Isopropylbenzene                                                                                                                                          | N.D.         | 50.         | 250       | ug/kg        | 98       | 99        | 76-120          | 0   | 30      |
| Methyl Acetate                                                                                                                                            | N.D.         | 100.        | 250       | ug/kg        | 106      | 109       | 61-152          | 3   | 30      |
| Methyl Tertiary Butyl Ether                                                                                                                               | N.D.         | 25.         | 250       | ug/kg        | 109      | 110       | 74-121          | 1   | 30      |
| 4-Methyl-2-pentanone                                                                                                                                      | N.D.         | 150.        | 500       | ug/kg        | 93       | 94        | 61-134          | 2   | 30      |
| Methylcyclohexane                                                                                                                                         | N.D.         | 50.         | 250       | ug/kg        | 114      | 114       | 57-138          | 0   | 30      |
| Methylene Chloride                                                                                                                                        | N.D.         | 100.        | 250       | ug/kg        | 113      | 114       | 76-124          | 1   | 30      |
| Styrene                                                                                                                                                   | N.D.         | 50.         | 250       | ug/kg        | 95       | 97        | 76-120          | 2   | 30      |
| 1,1,2,2-Tetrachloroethane                                                                                                                                 | N.D.         | 50.         | 250       | ug/kg        | 82       | 84        | 71-123          | 2   | 30      |
| Tetrachloroethene                                                                                                                                         | N.D.         | 50.         | 250       | ug/kg        | 98       | 99        | 77-120          | 1   | 30      |
| Toluene                                                                                                                                                   | N.D.         | 50.         | 250       | ug/kg        | 99       | 101       | 80-120          | 2   | 30      |
| 1,2,4-Trichlorobenzene                                                                                                                                    | N.D.         | 50.         | 250       | ug/kg        | 76       | 76        | 68-120          | 1   | 30      |
| 1,1,1-Trichloroethane                                                                                                                                     | N.D.         | 50.         | 250       | ug/kg        | 111      | 114       | 71-125          | 2   | 30      |
| 1,1,2-Trichloroethane                                                                                                                                     | N.D.         | 50.         | 250       | ug/kg        | 94       | 95        | 80-120          | 1   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>   | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Trichloroethene        | N.D.                | 50.                | 250              | ug/kg               | 112             | 113              | 80-120                 | 0          | 30             |
| Trichlorofluoromethane | N.D.                | 100.               | 250              | ug/kg               | 101             | 103              | 58-133                 | 2          | 30             |
| Vinyl Chloride         | N.D.                | 50.                | 250              | ug/kg               | 101             | 100              | 53-120                 | 1          | 30             |
| Xylene (Total)         | N.D.                | 50.                | 250              | ug/kg               | 99              | 100              | 80-120                 | 1          | 30             |

|                             |                                    |      |       |       |      |      |        |   |    |
|-----------------------------|------------------------------------|------|-------|-------|------|------|--------|---|----|
| Batch number: Q111161AA     | Sample number(s): 6262287, 6262294 |      |       |       |      |      |        |   |    |
| Acetone                     | N.D.                               | 350. | 1,000 | ug/kg | 70   | 76   | 32-209 | 7 | 30 |
| Benzene                     | N.D.                               | 25.  | 250   | ug/kg | 110  | 111  | 80-120 | 1 | 30 |
| Bromodichloromethane        | N.D.                               | 50.  | 250   | ug/kg | 107  | 106  | 78-120 | 1 | 30 |
| Bromoform                   | N.D.                               | 50.  | 250   | ug/kg | 86   | 87   | 70-120 | 1 | 30 |
| Bromomethane                | N.D.                               | 100. | 250   | ug/kg | 100  | 102  | 32-162 | 1 | 30 |
| 2-Butanone                  | N.D.                               | 200. | 500   | ug/kg | 78   | 82   | 46-153 | 6 | 30 |
| Carbon Disulfide            | N.D.                               | 50.  | 250   | ug/kg | 119  | 119  | 67-122 | 1 | 30 |
| Carbon Tetrachloride        | N.D.                               | 50.  | 250   | ug/kg | 108  | 109  | 69-122 | 1 | 30 |
| Chlorobenzene               | N.D.                               | 50.  | 250   | ug/kg | 91   | 92   | 80-120 | 1 | 30 |
| Chloroethane                | N.D.                               | 100. | 250   | ug/kg | 96   | 98   | 37-154 | 3 | 30 |
| Chloroform                  | N.D.                               | 50.  | 250   | ug/kg | 108  | 108  | 80-120 | 0 | 30 |
| Chloromethane               | N.D.                               | 100. | 250   | ug/kg | 98   | 97   | 54-132 | 1 | 30 |
| Cyclohexane                 | N.D.                               | 50.  | 250   | ug/kg | 118  | 119  | 62-121 | 1 | 30 |
| 1,2-Dibromo-3-chloropropane | N.D.                               | 100. | 250   | ug/kg | 73   | 75   | 58-120 | 3 | 30 |
| Dibromochloromethane        | N.D.                               | 50.  | 250   | ug/kg | 90   | 91   | 77-120 | 1 | 30 |
| 1,2-Dibromoethane           | N.D.                               | 50.  | 250   | ug/kg | 91   | 91   | 80-120 | 0 | 30 |
| 1,2-Dichlorobenzene         | N.D.                               | 50.  | 250   | ug/kg | 84   | 85   | 79-120 | 1 | 30 |
| 1,3-Dichlorobenzene         | N.D.                               | 50.  | 250   | ug/kg | 85   | 85   | 78-120 | 0 | 30 |
| 1,4-Dichlorobenzene         | N.D.                               | 50.  | 250   | ug/kg | 84   | 86   | 79-120 | 2 | 30 |
| Dichlorodifluoromethane     | N.D.                               | 100. | 250   | ug/kg | 60   | 57   | 20-120 | 6 | 30 |
| 1,1-Dichloroethane          | N.D.                               | 50.  | 250   | ug/kg | 110  | 109  | 80-120 | 0 | 30 |
| 1,2-Dichloroethane          | N.D.                               | 50.  | 250   | ug/kg | 106  | 108  | 71-129 | 2 | 30 |
| 1,1-Dichloroethene          | N.D.                               | 50.  | 250   | ug/kg | 115  | 117  | 73-123 | 1 | 30 |
| cis-1,2-Dichloroethene      | N.D.                               | 50.  | 250   | ug/kg | 111  | 112  | 80-120 | 1 | 30 |
| trans-1,2-Dichloroethene    | N.D.                               | 50.  | 250   | ug/kg | 113  | 112  | 79-120 | 1 | 30 |
| 1,2-Dichloropropane         | N.D.                               | 50.  | 250   | ug/kg | 106  | 107  | 80-120 | 1 | 30 |
| cis-1,3-Dichloropropene     | N.D.                               | 50.  | 250   | ug/kg | 110  | 109  | 80-120 | 1 | 30 |
| trans-1,3-Dichloropropene   | N.D.                               | 50.  | 250   | ug/kg | 89   | 89   | 77-120 | 0 | 30 |
| Ethylbenzene                | N.D.                               | 50.  | 250   | ug/kg | 90   | 91   | 80-120 | 1 | 30 |
| Freon 113                   | N.D.                               | 100. | 500   | ug/kg | 136* | 136* | 61-126 | 0 | 30 |
| 2-Hexanone                  | N.D.                               | 150. | 500   | ug/kg | 65   | 68   | 45-155 | 4 | 30 |
| Isopropylbenzene            | N.D.                               | 50.  | 250   | ug/kg | 93   | 94   | 76-120 | 1 | 30 |
| Methyl Acetate              | N.D.                               | 100. | 250   | ug/kg | 115  | 116  | 61-152 | 1 | 30 |
| Methyl Tertiary Butyl Ether | N.D.                               | 25.  | 250   | ug/kg | 146* | 145* | 74-121 | 0 | 30 |
| 4-Methyl-2-pentanone        | N.D.                               | 150. | 500   | ug/kg | 98   | 98   | 61-134 | 0 | 30 |
| Methylcyclohexane           | N.D.                               | 50.  | 250   | ug/kg | 118  | 117  | 57-138 | 0 | 30 |
| Methylene Chloride          | N.D.                               | 100. | 250   | ug/kg | 113  | 112  | 76-124 | 1 | 30 |
| Styrene                     | N.D.                               | 50.  | 250   | ug/kg | 91   | 91   | 76-120 | 0 | 30 |
| 1,1,2,2-Tetrachloroethane   | N.D.                               | 50.  | 250   | ug/kg | 80   | 80   | 71-123 | 1 | 30 |
| Tetrachloroethene           | N.D.                               | 50.  | 250   | ug/kg | 88   | 89   | 77-120 | 2 | 30 |
| Toluene                     | N.D.                               | 50.  | 250   | ug/kg | 91   | 90   | 80-120 | 1 | 30 |
| 1,2,4-Trichlorobenzene      | N.D.                               | 50.  | 250   | ug/kg | 78   | 79   | 68-120 | 0 | 30 |
| 1,1,1-Trichloroethane       | N.D.                               | 50.  | 250   | ug/kg | 115  | 116  | 71-125 | 1 | 30 |
| 1,1,2-Trichloroethane       | N.D.                               | 50.  | 250   | ug/kg | 90   | 90   | 80-120 | 0 | 30 |
| Trichloroethene             | N.D.                               | 50.  | 250   | ug/kg | 103  | 105  | 80-120 | 2 | 30 |
| Trichlorofluoromethane      | N.D.                               | 100. | 250   | ug/kg | 93   | 96   | 58-133 | 3 | 30 |
| Vinyl Chloride              | N.D.                               | 50.  | 250   | ug/kg | 93   | 93   | 53-120 | 0 | 30 |
| Xylene (Total)              | N.D.                               | 50.  | 250   | ug/kg | 93   | 93   | 80-120 | 0 | 30 |

|                         |                           |      |       |       |     |     |        |    |    |
|-------------------------|---------------------------|------|-------|-------|-----|-----|--------|----|----|
| Batch number: Q111162AA | Sample number(s): 6262285 |      |       |       |     |     |        |    |    |
| Acetone                 | N.D.                      | 350. | 1,000 | ug/kg | 62  | 70  | 32-209 | 13 | 30 |
| Benzene                 | N.D.                      | 25.  | 250   | ug/kg | 115 | 116 | 80-120 | 0  | 30 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| Analysis Name               | Blank Result | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Bromodichloromethane        | N.D.         | 50.         | 250       | ug/kg        | 108      | 108       | 78-120          | 0   | 30      |
| Bromoform                   | N.D.         | 50.         | 250       | ug/kg        | 84       | 85        | 70-120          | 2   | 30      |
| Bromomethane                | N.D.         | 100.        | 250       | ug/kg        | 92       | 93        | 32-162          | 1   | 30      |
| 2-Butanone                  | N.D.         | 200.        | 500       | ug/kg        | 77       | 78        | 46-153          | 2   | 30      |
| Carbon Disulfide            | N.D.         | 50.         | 250       | ug/kg        | 123*     | 124*      | 67-122          | 1   | 30      |
| Carbon Tetrachloride        | N.D.         | 50.         | 250       | ug/kg        | 114      | 113       | 69-122          | 1   | 30      |
| Chlorobenzene               | N.D.         | 50.         | 250       | ug/kg        | 93       | 94        | 80-120          | 1   | 30      |
| Chloroethane                | N.D.         | 100.        | 250       | ug/kg        | 88       | 93        | 37-154          | 6   | 30      |
| Chloroform                  | N.D.         | 50.         | 250       | ug/kg        | 112      | 112       | 80-120          | 0   | 30      |
| Chloromethane               | N.D.         | 100.        | 250       | ug/kg        | 105      | 99        | 54-132          | 5   | 30      |
| Cyclohexane                 | N.D.         | 50.         | 250       | ug/kg        | 125*     | 118       | 62-121          | 6   | 30      |
| 1,2-Dibromo-3-chloropropane | N.D.         | 100.        | 250       | ug/kg        | 73       | 72        | 58-120          | 2   | 30      |
| Dibromochloromethane        | N.D.         | 50.         | 250       | ug/kg        | 90       | 90        | 77-120          | 0   | 30      |
| 1,2-Dibromoethane           | N.D.         | 50.         | 250       | ug/kg        | 90       | 90        | 80-120          | 0   | 30      |
| 1,2-Dichlorobenzene         | N.D.         | 50.         | 250       | ug/kg        | 84       | 86        | 79-120          | 2   | 30      |
| 1,3-Dichlorobenzene         | N.D.         | 50.         | 250       | ug/kg        | 84       | 86        | 78-120          | 2   | 30      |
| 1,4-Dichlorobenzene         | N.D.         | 50.         | 250       | ug/kg        | 84       | 85        | 79-120          | 2   | 30      |
| Dichlorodifluoromethane     | N.D.         | 100.        | 250       | ug/kg        | 68       | 56        | 20-120          | 20  | 30      |
| 1,1-Dichloroethane          | N.D.         | 50.         | 250       | ug/kg        | 110      | 112       | 80-120          | 1   | 30      |
| 1,2-Dichloroethane          | N.D.         | 50.         | 250       | ug/kg        | 109      | 109       | 71-129          | 0   | 30      |
| 1,1-Dichloroethene          | N.D.         | 50.         | 250       | ug/kg        | 123      | 121       | 73-123          | 1   | 30      |
| cis-1,2-Dichloroethene      | N.D.         | 50.         | 250       | ug/kg        | 113      | 117       | 80-120          | 3   | 30      |
| trans-1,2-Dichloroethene    | N.D.         | 50.         | 250       | ug/kg        | 115      | 116       | 79-120          | 1   | 30      |
| 1,2-Dichloropropane         | N.D.         | 50.         | 250       | ug/kg        | 109      | 109       | 80-120          | 0   | 30      |
| cis-1,3-Dichloropropene     | N.D.         | 50.         | 250       | ug/kg        | 109      | 110       | 80-120          | 0   | 30      |
| trans-1,3-Dichloropropene   | N.D.         | 50.         | 250       | ug/kg        | 88       | 88        | 77-120          | 0   | 30      |
| Ethylbenzene                | N.D.         | 50.         | 250       | ug/kg        | 91       | 92        | 80-120          | 1   | 30      |
| Freon 113                   | N.D.         | 100.        | 500       | ug/kg        | 144*     | 136*      | 61-126          | 5   | 30      |
| 2-Hexanone                  | N.D.         | 150.        | 500       | ug/kg        | 62       | 63        | 45-155          | 1   | 30      |
| Isopropylbenzene            | N.D.         | 50.         | 250       | ug/kg        | 94       | 95        | 76-120          | 2   | 30      |
| Methyl Acetate              | N.D.         | 100.        | 250       | ug/kg        | 118      | 117       | 61-152          | 1   | 30      |
| Methyl Tertiary Butyl Ether | N.D.         | 25.         | 250       | ug/kg        | 149*     | 146*      | 74-121          | 2   | 30      |
| 4-Methyl-2-pentanone        | N.D.         | 150.        | 500       | ug/kg        | 98       | 99        | 61-134          | 1   | 30      |
| Methylcyclohexane           | N.D.         | 50.         | 250       | ug/kg        | 120      | 115       | 57-138          | 4   | 30      |
| Methylene Chloride          | N.D.         | 100.        | 250       | ug/kg        | 114      | 113       | 76-124          | 1   | 30      |
| Styrene                     | N.D.         | 50.         | 250       | ug/kg        | 92       | 92        | 76-120          | 1   | 30      |
| 1,1,2,2-Tetrachloroethane   | N.D.         | 50.         | 250       | ug/kg        | 79       | 80        | 71-123          | 0   | 30      |
| Tetrachloroethene           | N.D.         | 50.         | 250       | ug/kg        | 90       | 91        | 77-120          | 2   | 30      |
| Toluene                     | N.D.         | 50.         | 250       | ug/kg        | 92       | 93        | 80-120          | 1   | 30      |
| 1,2,4-Trichlorobenzene      | N.D.         | 50.         | 250       | ug/kg        | 74       | 77        | 68-120          | 4   | 30      |
| 1,1,1-Trichloroethane       | N.D.         | 50.         | 250       | ug/kg        | 120      | 121       | 71-125          | 0   | 30      |
| 1,1,2-Trichloroethane       | N.D.         | 50.         | 250       | ug/kg        | 89       | 89        | 80-120          | 0   | 30      |
| Trichloroethene             | N.D.         | 50.         | 250       | ug/kg        | 108      | 109       | 80-120          | 0   | 30      |
| Trichlorofluoromethane      | N.D.         | 100.        | 250       | ug/kg        | 100      | 98        | 58-133          | 3   | 30      |
| Vinyl Chloride              | N.D.         | 50.         | 250       | ug/kg        | 100      | 99        | 53-120          | 1   | 30      |
| Xylene (Total)              | N.D.         | 50.         | 250       | ug/kg        | 93       | 94        | 80-120          | 1   | 30      |

Batch number: X111131AA

Sample number(s):  
6262260, 6262269, 6262272, 6262275, 6262281, 6262284, 6262286, 6262289-  
6262290, 6262292-6262293, 6262296

|                      |      |     |    |       |     |     |        |   |    |
|----------------------|------|-----|----|-------|-----|-----|--------|---|----|
| Acetone              | N.D. | 7.  | 20 | ug/kg | 106 | 117 | 32-209 | 9 | 30 |
| Benzene              | N.D. | 0.5 | 5  | ug/kg | 94  | 91  | 80-120 | 4 | 30 |
| Bromodichloromethane | N.D. | 1.  | 5  | ug/kg | 88  | 85  | 78-120 | 4 | 30 |
| Bromoform            | N.D. | 1.  | 5  | ug/kg | 85  | 84  | 70-120 | 1 | 30 |
| Bromomethane         | N.D. | 2.  | 5  | ug/kg | 74  | 68  | 32-162 | 8 | 30 |
| 2-Butanone           | N.D. | 4.  | 10 | ug/kg | 100 | 106 | 46-153 | 5 | 30 |
| Carbon Disulfide     | N.D. | 1.  | 5  | ug/kg | 78  | 75  | 67-122 | 4 | 30 |
| Carbon Tetrachloride | N.D. | 1.  | 5  | ug/kg | 91  | 86  | 69-122 | 5 | 30 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>        | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-----------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Chlorobenzene               | N.D.                | 1.                 | 5                | ug/kg               | 97              | 93               | 80-120                 | 4          | 30             |
| Chloroethane                | N.D.                | 2.                 | 5                | ug/kg               | 70              | 65               | 37-154                 | 6          | 30             |
| Chloroform                  | N.D.                | 1.                 | 5                | ug/kg               | 95              | 92               | 80-120                 | 4          | 30             |
| Chloromethane               | N.D.                | 2.                 | 5                | ug/kg               | 81              | 76               | 54-132                 | 5          | 30             |
| Cyclohexane                 | N.D.                | 1.                 | 5                | ug/kg               | 77              | 73               | 62-121                 | 5          | 30             |
| 1,2-Dibromo-3-chloropropane | N.D.                | 2.                 | 5                | ug/kg               | 78              | 88               | 58-120                 | 13         | 30             |
| Dibromochloromethane        | N.D.                | 1.                 | 5                | ug/kg               | 89              | 88               | 77-120                 | 0          | 30             |
| 1,2-Dibromoethane           | N.D.                | 1.                 | 5                | ug/kg               | 96              | 97               | 80-120                 | 1          | 30             |
| 1,2-Dichlorobenzene         | N.D.                | 1.                 | 5                | ug/kg               | 92              | 89               | 79-120                 | 3          | 30             |
| 1,3-Dichlorobenzene         | N.D.                | 1.                 | 5                | ug/kg               | 90              | 86               | 78-120                 | 4          | 30             |
| 1,4-Dichlorobenzene         | N.D.                | 1.                 | 5                | ug/kg               | 95              | 92               | 79-120                 | 3          | 30             |
| Dichlorodifluoromethane     | N.D.                | 2.                 | 5                | ug/kg               | 62              | 59               | 20-120                 | 5          | 30             |
| 1,1-Dichloroethane          | N.D.                | 1.                 | 5                | ug/kg               | 92              | 90               | 80-120                 | 2          | 30             |
| 1,2-Dichloroethane          | N.D.                | 1.                 | 5                | ug/kg               | 98              | 95               | 71-129                 | 2          | 30             |
| 1,1-Dichloroethene          | N.D.                | 1.                 | 5                | ug/kg               | 94              | 90               | 73-123                 | 5          | 30             |
| cis-1,2-Dichloroethene      | N.D.                | 1.                 | 5                | ug/kg               | 97              | 92               | 80-120                 | 5          | 30             |
| trans-1,2-Dichloroethene    | N.D.                | 1.                 | 5                | ug/kg               | 95              | 93               | 79-120                 | 2          | 30             |
| 1,2-Dichloropropane         | N.D.                | 1.                 | 5                | ug/kg               | 91              | 87               | 80-120                 | 5          | 30             |
| cis-1,3-Dichloropropene     | N.D.                | 1.                 | 5                | ug/kg               | 83              | 80               | 80-120                 | 3          | 30             |
| trans-1,3-Dichloropropene   | N.D.                | 1.                 | 5                | ug/kg               | 77              | 79               | 77-120                 | 2          | 30             |
| Ethylbenzene                | N.D.                | 1.                 | 5                | ug/kg               | 93              | 90               | 80-120                 | 3          | 30             |
| Freon 113                   | N.D.                | 2.                 | 10               | ug/kg               | 81              | 78               | 61-126                 | 4          | 30             |
| 2-Hexanone                  | N.D.                | 3.                 | 10               | ug/kg               | 88              | 96               | 45-155                 | 9          | 30             |
| Isopropylbenzene            | N.D.                | 1.                 | 5                | ug/kg               | 95              | 92               | 76-120                 | 3          | 30             |
| Methyl Acetate              | N.D.                | 2.                 | 5                | ug/kg               | 99              | 130              | 61-152                 | 28         | 30             |
| Methyl Tertiary Butyl Ether | N.D.                | 0.5                | 5                | ug/kg               | 88              | 87               | 74-121                 | 1          | 30             |
| 4-Methyl-2-pentanone        | N.D.                | 3.                 | 10               | ug/kg               | 93              | 97               | 61-134                 | 5          | 30             |
| Methylcyclohexane           | N.D.                | 1.                 | 5                | ug/kg               | 77              | 74               | 57-138                 | 4          | 30             |
| Methylene Chloride          | N.D.                | 2.                 | 5                | ug/kg               | 92              | 89               | 76-124                 | 3          | 30             |
| Styrene                     | N.D.                | 1.                 | 5                | ug/kg               | 90              | 83               | 76-120                 | 8          | 30             |
| 1,1,2,2-Tetrachloroethane   | N.D.                | 1.                 | 5                | ug/kg               | 88              | 89               | 71-123                 | 2          | 30             |
| Tetrachloroethene           | N.D.                | 1.                 | 5                | ug/kg               | 101             | 101              | 77-120                 | 0          | 30             |
| Toluene                     | N.D.                | 1.                 | 5                | ug/kg               | 94              | 91               | 80-120                 | 2          | 30             |
| 1,2,4-Trichlorobenzene      | N.D.                | 1.                 | 5                | ug/kg               | 88              | 83               | 68-120                 | 5          | 30             |
| 1,1,1-Trichloroethane       | N.D.                | 1.                 | 5                | ug/kg               | 90              | 87               | 71-125                 | 3          | 30             |
| 1,1,2-Trichloroethane       | N.D.                | 1.                 | 5                | ug/kg               | 89              | 91               | 80-120                 | 2          | 30             |
| Trichloroethene             | N.D.                | 1.                 | 5                | ug/kg               | 96              | 91               | 80-120                 | 5          | 30             |
| Trichlorofluoromethane      | N.D.                | 2.                 | 5                | ug/kg               | 81              | 76               | 58-133                 | 7          | 30             |
| Vinyl Chloride              | N.D.                | 1.                 | 5                | ug/kg               | 79              | 76               | 53-120                 | 4          | 30             |
| Xylene (Total)              | N.D.                | 1.                 | 5                | ug/kg               | 96              | 94               | 80-120                 | 3          | 30             |

Batch number: X111151AA

Sample number(s): 6262263, 6262265, 6262278, 6262288, 6262291

|                             |      |     |    |       |     |     |        |   |    |
|-----------------------------|------|-----|----|-------|-----|-----|--------|---|----|
| Acetone                     | N.D. | 7.  | 20 | ug/kg | 103 | 100 | 32-209 | 4 | 30 |
| Benzene                     | N.D. | 0.5 | 5  | ug/kg | 94  | 95  | 80-120 | 1 | 30 |
| Bromodichloromethane        | N.D. | 1.  | 5  | ug/kg | 91  | 91  | 78-120 | 0 | 30 |
| Bromoform                   | N.D. | 1.  | 5  | ug/kg | 90  | 89  | 70-120 | 1 | 30 |
| Bromomethane                | N.D. | 2.  | 5  | ug/kg | 75  | 77  | 32-162 | 2 | 30 |
| 2-Butanone                  | N.D. | 4.  | 10 | ug/kg | 106 | 105 | 46-153 | 1 | 30 |
| Carbon Disulfide            | N.D. | 1.  | 5  | ug/kg | 81  | 81  | 67-122 | 0 | 30 |
| Carbon Tetrachloride        | N.D. | 1.  | 5  | ug/kg | 92  | 92  | 69-122 | 0 | 30 |
| Chlorobenzene               | N.D. | 1.  | 5  | ug/kg | 94  | 97  | 80-120 | 3 | 30 |
| Chloroethane                | N.D. | 2.  | 5  | ug/kg | 77  | 78  | 37-154 | 1 | 30 |
| Chloroform                  | N.D. | 1.  | 5  | ug/kg | 95  | 95  | 80-120 | 0 | 30 |
| Chloromethane               | N.D. | 2.  | 5  | ug/kg | 84  | 84  | 54-132 | 1 | 30 |
| Cyclohexane                 | N.D. | 1.  | 5  | ug/kg | 83  | 84  | 62-121 | 2 | 30 |
| 1,2-Dibromo-3-chloropropane | N.D. | 2.  | 5  | ug/kg | 104 | 102 | 58-120 | 2 | 30 |
| Dibromochloromethane        | N.D. | 1.  | 5  | ug/kg | 94  | 94  | 77-120 | 1 | 30 |
| 1,2-Dibromoethane           | N.D. | 1.  | 5  | ug/kg | 99  | 99  | 80-120 | 1 | 30 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| Analysis Name               | Blank Result | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| 1,2-Dichlorobenzene         | N.D.         | 1.          | 5         | ug/kg        | 94       | 97        | 79-120          | 4   | 30      |
| 1,3-Dichlorobenzene         | N.D.         | 1.          | 5         | ug/kg        | 90       | 92        | 78-120          | 2   | 30      |
| 1,4-Dichlorobenzene         | N.D.         | 1.          | 5         | ug/kg        | 96       | 96        | 79-120          | 0   | 30      |
| Dichlorodifluoromethane     | N.D.         | 2.          | 5         | ug/kg        | 64       | 64        | 20-120          | 1   | 30      |
| 1,1-Dichloroethane          | N.D.         | 1.          | 5         | ug/kg        | 94       | 92        | 80-120          | 3   | 30      |
| 1,2-Dichloroethane          | N.D.         | 1.          | 5         | ug/kg        | 97       | 97        | 71-129          | 0   | 30      |
| 1,1-Dichloroethene          | N.D.         | 1.          | 5         | ug/kg        | 91       | 91        | 73-123          | 0   | 30      |
| cis-1,2-Dichloroethene      | N.D.         | 1.          | 5         | ug/kg        | 95       | 95        | 80-120          | 1   | 30      |
| trans-1,2-Dichloroethene    | N.D.         | 1.          | 5         | ug/kg        | 93       | 92        | 79-120          | 1   | 30      |
| 1,2-Dichloropropane         | N.D.         | 1.          | 5         | ug/kg        | 94       | 93        | 80-120          | 1   | 30      |
| cis-1,3-Dichloropropene     | N.D.         | 1.          | 5         | ug/kg        | 87       | 90        | 80-120          | 3   | 30      |
| trans-1,3-Dichloropropene   | N.D.         | 1.          | 5         | ug/kg        | 91       | 90        | 77-120          | 1   | 30      |
| Ethylbenzene                | N.D.         | 1.          | 5         | ug/kg        | 96       | 97        | 80-120          | 2   | 30      |
| Freon 113                   | N.D.         | 2.          | 10        | ug/kg        | 85       | 86        | 61-126          | 0   | 30      |
| 2-Hexanone                  | N.D.         | 3.          | 10        | ug/kg        | 106      | 105       | 45-155          | 1   | 30      |
| Isopropylbenzene            | N.D.         | 1.          | 5         | ug/kg        | 99       | 100       | 76-120          | 1   | 30      |
| Methyl Acetate              | N.D.         | 2.          | 5         | ug/kg        | 122      | 107       | 61-152          | 14  | 30      |
| Methyl Tertiary Butyl Ether | N.D.         | 0.5         | 5         | ug/kg        | 89       | 89        | 74-121          | 0   | 30      |
| 4-Methyl-2-pentanone        | N.D.         | 3.          | 10        | ug/kg        | 108      | 101       | 61-134          | 7   | 30      |
| Methylcyclohexane           | N.D.         | 1.          | 5         | ug/kg        | 84       | 86        | 57-138          | 2   | 30      |
| Methylene Chloride          | N.D.         | 2.          | 5         | ug/kg        | 92       | 92        | 76-124          | 0   | 30      |
| Styrene                     | N.D.         | 1.          | 5         | ug/kg        | 94       | 90        | 76-120          | 4   | 30      |
| 1,1,2,2-Tetrachloroethane   | N.D.         | 1.          | 5         | ug/kg        | 98       | 98        | 71-123          | 0   | 30      |
| Tetrachloroethene           | N.D.         | 1.          | 5         | ug/kg        | 94       | 94        | 77-120          | 0   | 30      |
| Toluene                     | N.D.         | 1.          | 5         | ug/kg        | 93       | 95        | 80-120          | 2   | 30      |
| 1,2,4-Trichlorobenzene      | N.D.         | 1.          | 5         | ug/kg        | 86       | 89        | 68-120          | 3   | 30      |
| 1,1,1-Trichloroethane       | N.D.         | 1.          | 5         | ug/kg        | 83       | 83        | 71-125          | 0   | 30      |
| 1,1,2-Trichloroethane       | N.D.         | 1.          | 5         | ug/kg        | 95       | 93        | 80-120          | 1   | 30      |
| Trichloroethene             | N.D.         | 1.          | 5         | ug/kg        | 95       | 92        | 80-120          | 3   | 30      |
| Trichlorofluoromethane      | N.D.         | 2.          | 5         | ug/kg        | 86       | 85        | 58-133          | 1   | 30      |
| Vinyl Chloride              | N.D.         | 1.          | 5         | ug/kg        | 87       | 86        | 53-120          | 1   | 30      |
| Xylene (Total)              | N.D.         | 1.          | 5         | ug/kg        | 97       | 99        | 80-120          | 2   | 30      |

Batch number: 11110SLA026

Sample number(s): 6262260-6262269

|                            |      |     |     |       |     |  |        |
|----------------------------|------|-----|-----|-------|-----|--|--------|
| Acenaphthene               | N.D. | 33. | 170 | ug/kg | 97  |  | 83-111 |
| Acenaphthylene             | N.D. | 33. | 170 | ug/kg | 103 |  | 68-120 |
| Acetophenone               | N.D. | 67. | 170 | ug/kg | 96  |  | 70-106 |
| Anthracene                 | N.D. | 33. | 170 | ug/kg | 101 |  | 83-111 |
| Atrazine                   | N.D. | 33. | 170 | ug/kg | 101 |  | 69-122 |
| Benzaldehyde               | N.D. | 67. | 170 | ug/kg | 25  |  | 10-74  |
| Benzo(a)anthracene         | N.D. | 33. | 170 | ug/kg | 100 |  | 82-111 |
| Benzo(a)pyrene             | N.D. | 33. | 170 | ug/kg | 93  |  | 63-138 |
| Benzo(b)fluoranthene       | N.D. | 33. | 170 | ug/kg | 98  |  | 61-133 |
| Benzo(g,h,i)perylene       | N.D. | 33. | 170 | ug/kg | 87  |  | 63-130 |
| Benzo(k)fluoranthene       | N.D. | 33. | 170 | ug/kg | 93  |  | 71-135 |
| 1,1'-Biphenyl              | N.D. | 33. | 170 | ug/kg | 99  |  | 82-106 |
| 4-Bromophenyl-phenylether  | N.D. | 33. | 170 | ug/kg | 102 |  | 79-117 |
| Butylbenzylphthalate       | N.D. | 67. | 170 | ug/kg | 106 |  | 83-122 |
| Di-n-butylphthalate        | N.D. | 67. | 170 | ug/kg | 101 |  | 79-112 |
| Caprolactam                | N.D. | 33. | 170 | ug/kg | 89  |  | 65-113 |
| Carbazole                  | N.D. | 33. | 170 | ug/kg | 100 |  | 83-111 |
| 4-Chloro-3-methylphenol    | N.D. | 67. | 170 | ug/kg | 100 |  | 74-119 |
| 4-Chloroaniline            | N.D. | 67. | 170 | ug/kg | 53  |  | 10-97  |
| bis(2-Chloroethoxy)methane | N.D. | 33. | 170 | ug/kg | 103 |  | 82-113 |
| bis(2-Chloroethyl) ether   | N.D. | 33. | 170 | ug/kg | 101 |  | 77-115 |
| 2-Chloronaphthalene        | N.D. | 33. | 170 | ug/kg | 85  |  | 59-139 |
| 2-Chlorophenol             | N.D. | 33. | 170 | ug/kg | 102 |  | 83-119 |
| 4-Chlorophenyl-phenylether | N.D. | 33. | 170 | ug/kg | 95  |  | 79-110 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>         | <u>Blank Result</u>               | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| 2,2'-oxybis(1-Chloropropane) | N.D.                              | 33.                | 170              | ug/kg               | 99              |                  | 67-130                 |            |                |
| Chrysene                     | N.D.                              | 33.                | 170              | ug/kg               | 98              |                  | 81-111                 |            |                |
| Dibenz(a,h)anthracene        | N.D.                              | 33.                | 170              | ug/kg               | 88              |                  | 67-129                 |            |                |
| Dibenzofuran                 | N.D.                              | 33.                | 170              | ug/kg               | 100             |                  | 85-110                 |            |                |
| 3,3'-Dichlorobenzidine       | N.D.                              | 100.               | 330              | ug/kg               | 53              |                  | 35-94                  |            |                |
| 2,4-Dichlorophenol           | N.D.                              | 33.                | 170              | ug/kg               | 103             |                  | 87-117                 |            |                |
| Diethylphthalate             | N.D.                              | 67.                | 170              | ug/kg               | 96              |                  | 82-113                 |            |                |
| 2,4-Dimethylphenol           | N.D.                              | 67.                | 170              | ug/kg               | 105             |                  | 83-120                 |            |                |
| Dimethylphthalate            | N.D.                              | 67.                | 170              | ug/kg               | 96              |                  | 85-111                 |            |                |
| 4,6-Dinitro-2-methylphenol   | N.D.                              | 170.               | 500              | ug/kg               | 94              |                  | 60-113                 |            |                |
| 2,4-Dinitrophenol            | N.D.                              | 330.               | 1,000            | ug/kg               | 81              |                  | 51-124                 |            |                |
| 2,4-Dinitrotoluene           | N.D.                              | 67.                | 170              | ug/kg               | 97              |                  | 80-116                 |            |                |
| 2,6-Dinitrotoluene           | N.D.                              | 33.                | 170              | ug/kg               | 94              |                  | 79-115                 |            |                |
| bis(2-Ethylhexyl)phthalate   | 120                               | 67.                | 330              | ug/kg               | 103             |                  | 80-119                 |            |                |
| J                            |                                   |                    |                  |                     |                 |                  |                        |            |                |
| Fluoranthene                 | N.D.                              | 33.                | 170              | ug/kg               | 101             |                  | 80-113                 |            |                |
| Fluorene                     | N.D.                              | 33.                | 170              | ug/kg               | 96              |                  | 81-117                 |            |                |
| Hexachlorobenzene            | N.D.                              | 33.                | 170              | ug/kg               | 99              |                  | 79-115                 |            |                |
| Hexachlorobutadiene          | N.D.                              | 67.                | 170              | ug/kg               | 100             |                  | 70-112                 |            |                |
| Hexachlorocyclopentadiene    | N.D.                              | 170.               | 500              | ug/kg               | 105             |                  | 64-127                 |            |                |
| Hexachloroethane             | N.D.                              | 33.                | 170              | ug/kg               | 96              |                  | 76-109                 |            |                |
| Indeno(1,2,3-cd)pyrene       | N.D.                              | 33.                | 170              | ug/kg               | 85              |                  | 64-128                 |            |                |
| Isophorone                   | N.D.                              | 33.                | 170              | ug/kg               | 105             |                  | 72-107                 |            |                |
| 2-Methylnaphthalene          | N.D.                              | 33.                | 170              | ug/kg               | 93              |                  | 79-110                 |            |                |
| 2-Methylphenol               | N.D.                              | 67.                | 170              | ug/kg               | 98              |                  | 80-119                 |            |                |
| 4-Methylphenol               | N.D.                              | 67.                | 170              | ug/kg               | 97              |                  | 74-116                 |            |                |
| Naphthalene                  | N.D.                              | 33.                | 170              | ug/kg               | 99              |                  | 83-112                 |            |                |
| 2-Nitroaniline               | N.D.                              | 33.                | 170              | ug/kg               | 101             |                  | 83-118                 |            |                |
| 3-Nitroaniline               | N.D.                              | 67.                | 170              | ug/kg               | 96              |                  | 66-114                 |            |                |
| 4-Nitroaniline               | N.D.                              | 67.                | 170              | ug/kg               | 74              |                  | 52-92                  |            |                |
| Nitrobenzene                 | N.D.                              | 33.                | 170              | ug/kg               | 108             |                  | 78-122                 |            |                |
| 2-Nitrophenol                | N.D.                              | 33.                | 170              | ug/kg               | 101             |                  | 81-114                 |            |                |
| 4-Nitrophenol                | N.D.                              | 170.               | 500              | ug/kg               | 93              |                  | 57-131                 |            |                |
| N-Nitroso-di-n-propylamine   | N.D.                              | 33.                | 170              | ug/kg               | 102             |                  | 70-113                 |            |                |
| N-Nitrosodiphenylamine       | N.D.                              | 33.                | 170              | ug/kg               | 105             |                  | 86-112                 |            |                |
| Di-n-octylphthalate          | N.D.                              | 67.                | 170              | ug/kg               | 107             |                  | 65-141                 |            |                |
| Pentachlorophenol            | N.D.                              | 170.               | 500              | ug/kg               | 102             |                  | 50-133                 |            |                |
| Phenanthrene                 | N.D.                              | 33.                | 170              | ug/kg               | 99              |                  | 83-109                 |            |                |
| Phenol                       | N.D.                              | 33.                | 170              | ug/kg               | 94              |                  | 74-115                 |            |                |
| Pyrene                       | N.D.                              | 33.                | 170              | ug/kg               | 104             |                  | 80-121                 |            |                |
| 2,4,5-Trichlorophenol        | N.D.                              | 67.                | 170              | ug/kg               | 97              |                  | 84-109                 |            |                |
| 2,4,6-Trichlorophenol        | N.D.                              | 33.                | 170              | ug/kg               | 103             |                  | 88-114                 |            |                |
| Batch number: 11110SLD026    | Sample number(s): 6262270-6262289 |                    |                  |                     |                 |                  |                        |            |                |
| Acenaphthene                 | N.D.                              | 33.                | 170              | ug/kg               | 100             |                  | 83-111                 |            |                |
| Acenaphthylene               | N.D.                              | 33.                | 170              | ug/kg               | 101             |                  | 68-120                 |            |                |
| Acetophenone                 | N.D.                              | 67.                | 170              | ug/kg               | 94              |                  | 70-106                 |            |                |
| Anthracene                   | N.D.                              | 33.                | 170              | ug/kg               | 98              |                  | 83-111                 |            |                |
| Atrazine                     | N.D.                              | 33.                | 170              | ug/kg               | 90              |                  | 69-122                 |            |                |
| Benzaldehyde                 | N.D.                              | 67.                | 170              | ug/kg               | 21              |                  | 10-74                  |            |                |
| Benzo(a)anthracene           | N.D.                              | 33.                | 170              | ug/kg               | 97              |                  | 82-111                 |            |                |
| Benzo(a)pyrene               | N.D.                              | 33.                | 170              | ug/kg               | 110             |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene         | N.D.                              | 33.                | 170              | ug/kg               | 118             |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene         | N.D.                              | 33.                | 170              | ug/kg               | 102             |                  | 63-130                 |            |                |
| Benzo(k)fluoranthene         | N.D.                              | 33.                | 170              | ug/kg               | 107             |                  | 71-135                 |            |                |
| 1,1'-Biphenyl                | N.D.                              | 33.                | 170              | ug/kg               | 98              |                  | 82-106                 |            |                |
| 4-Bromophenyl-phenylether    | N.D.                              | 33.                | 170              | ug/kg               | 97              |                  | 79-117                 |            |                |
| Butylbenzylphthalate         | N.D.                              | 67.                | 170              | ug/kg               | 95              |                  | 83-122                 |            |                |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>                                        | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-------------------------------------------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Di-n-butylphthalate                                         | N.D.                | 67.                | 170              | ug/kg               | 94              |                  | 79-112                 |            |                |
| Caprolactam                                                 | N.D.                | 33.                | 170              | ug/kg               | 92              |                  | 65-113                 |            |                |
| Carbazole                                                   | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 83-111                 |            |                |
| 4-Chloro-3-methylphenol                                     | N.D.                | 67.                | 170              | ug/kg               | 97              |                  | 74-119                 |            |                |
| 4-Chloroaniline                                             | N.D.                | 67.                | 170              | ug/kg               | 77              |                  | 10-97                  |            |                |
| bis(2-Chloroethoxy)methane                                  | N.D.                | 33.                | 170              | ug/kg               | 99              |                  | 82-113                 |            |                |
| bis(2-Chloroethyl) ether                                    | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 77-115                 |            |                |
| 2-Chloronaphthalene                                         | N.D.                | 33.                | 170              | ug/kg               | 72              |                  | 59-139                 |            |                |
| 2-Chlorophenol                                              | N.D.                | 33.                | 170              | ug/kg               | 103             |                  | 83-119                 |            |                |
| 4-Chlorophenyl-phenylether                                  | N.D.                | 33.                | 170              | ug/kg               | 97              |                  | 79-110                 |            |                |
| 2,2'-oxybis(1-Chloropropane)                                | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 67-130                 |            |                |
| Chrysene                                                    | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 81-111                 |            |                |
| Dibenz (a, h) anthracene                                    | N.D.                | 33.                | 170              | ug/kg               | 104             |                  | 67-129                 |            |                |
| Dibenzofuran                                                | N.D.                | 33.                | 170              | ug/kg               | 101             |                  | 85-110                 |            |                |
| 3,3'-Dichlorobenzidine                                      | N.D.                | 100.               | 330              | ug/kg               | 78              |                  | 35-94                  |            |                |
| 2,4-Dichlorophenol                                          | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 87-117                 |            |                |
| Diethylphthalate                                            | N.D.                | 67.                | 170              | ug/kg               | 97              |                  | 82-113                 |            |                |
| 2,4-Dimethylphenol                                          | N.D.                | 67.                | 170              | ug/kg               | 100             |                  | 83-120                 |            |                |
| Dimethylphthalate                                           | N.D.                | 67.                | 170              | ug/kg               | 98              |                  | 85-111                 |            |                |
| 4,6-Dinitro-2-methylphenol                                  | N.D.                | 170.               | 500              | ug/kg               | 100             |                  | 60-113                 |            |                |
| 2,4-Dinitrophenol                                           | N.D.                | 330.               | 1,000            | ug/kg               | 98              |                  | 51-124                 |            |                |
| 2,4-Dinitrotoluene                                          | N.D.                | 67.                | 170              | ug/kg               | 105             |                  | 80-116                 |            |                |
| 2,6-Dinitrotoluene                                          | N.D.                | 33.                | 170              | ug/kg               | 103             |                  | 79-115                 |            |                |
| bis(2-Ethylhexyl) phthalate                                 | N.D.                | 67.                | 330              | ug/kg               | 93              |                  | 80-119                 |            |                |
| Fluoranthene                                                | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 80-113                 |            |                |
| Fluorene                                                    | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 81-117                 |            |                |
| Hexachlorobenzene                                           | N.D.                | 33.                | 170              | ug/kg               | 99              |                  | 79-115                 |            |                |
| Hexachlorobutadiene                                         | N.D.                | 67.                | 170              | ug/kg               | 94              |                  | 70-112                 |            |                |
| Hexachlorocyclopentadiene                                   | N.D.                | 170.               | 500              | ug/kg               | 98              |                  | 64-127                 |            |                |
| Hexachloroethane                                            | N.D.                | 33.                | 170              | ug/kg               | 91              |                  | 76-109                 |            |                |
| Indeno (1,2,3-cd) pyrene                                    | N.D.                | 33.                | 170              | ug/kg               | 104             |                  | 64-128                 |            |                |
| Isophorone                                                  | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 72-107                 |            |                |
| 2-Methylnaphthalene                                         | N.D.                | 33.                | 170              | ug/kg               | 92              |                  | 79-110                 |            |                |
| 2-Methylphenol                                              | N.D.                | 67.                | 170              | ug/kg               | 100             |                  | 80-119                 |            |                |
| 4-Methylphenol                                              | N.D.                | 67.                | 170              | ug/kg               | 100             |                  | 74-116                 |            |                |
| Naphthalene                                                 | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 83-112                 |            |                |
| 2-Nitroaniline                                              | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 83-118                 |            |                |
| 3-Nitroaniline                                              | N.D.                | 67.                | 170              | ug/kg               | 101             |                  | 66-114                 |            |                |
| 4-Nitroaniline                                              | N.D.                | 67.                | 170              | ug/kg               | 84              |                  | 52-92                  |            |                |
| Nitrobenzene                                                | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 78-122                 |            |                |
| 2-Nitrophenol                                               | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 81-114                 |            |                |
| 4-Nitrophenol                                               | N.D.                | 170.               | 500              | ug/kg               | 87              |                  | 57-131                 |            |                |
| N-Nitroso-di-n-propylamine                                  | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 70-113                 |            |                |
| N-Nitrosodiphenylamine                                      | N.D.                | 33.                | 170              | ug/kg               | 101             |                  | 86-112                 |            |                |
| Di-n-octylphthalate                                         | N.D.                | 67.                | 170              | ug/kg               | 111             |                  | 65-141                 |            |                |
| Pentachlorophenol                                           | N.D.                | 170.               | 500              | ug/kg               | 98              |                  | 50-133                 |            |                |
| Phenanthrene                                                | N.D.                | 33.                | 170              | ug/kg               | 97              |                  | 83-109                 |            |                |
| Phenol                                                      | N.D.                | 33.                | 170              | ug/kg               | 102             |                  | 74-115                 |            |                |
| Pyrene                                                      | N.D.                | 33.                | 170              | ug/kg               | 102             |                  | 80-121                 |            |                |
| 2,4,5-Trichlorophenol                                       | N.D.                | 67.                | 170              | ug/kg               | 98              |                  | 84-109                 |            |                |
| 2,4,6-Trichlorophenol                                       | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 88-114                 |            |                |
| Batch number: 11111SLA026 Sample number(s): 6262290-6262296 |                     |                    |                  |                     |                 |                  |                        |            |                |
| Acenaphthene                                                | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 83-111                 |            |                |
| Acenaphthylene                                              | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 68-120                 |            |                |
| Acetophenone                                                | N.D.                | 67.                | 170              | ug/kg               | 93              |                  | 70-106                 |            |                |
| Anthracene                                                  | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 83-111                 |            |                |
| Atrazine                                                    | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 69-122                 |            |                |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>         | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Benzaldehyde                 | N.D.                | 67.                | 170              | ug/kg               | 58              |                  | 10-74                  |            |                |
| Benzo(a)anthracene           | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 82-111                 |            |                |
| Benzo(a)pyrene               | N.D.                | 33.                | 170              | ug/kg               | 101             |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene         | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene         | N.D.                | 33.                | 170              | ug/kg               | 101             |                  | 63-130                 |            |                |
| Benzo(k)fluoranthene         | N.D.                | 33.                | 170              | ug/kg               | 112             |                  | 71-135                 |            |                |
| 1,1'-Biphenyl                | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 82-106                 |            |                |
| 4-Bromophenyl-phenylether    | N.D.                | 33.                | 170              | ug/kg               | 97              |                  | 79-117                 |            |                |
| Butylbenzylphthalate         | N.D.                | 67.                | 170              | ug/kg               | 102             |                  | 83-122                 |            |                |
| Di-n-butylphthalate          | N.D.                | 67.                | 170              | ug/kg               | 93              |                  | 79-112                 |            |                |
| Caprolactam                  | N.D.                | 33.                | 170              | ug/kg               | 89              |                  | 65-113                 |            |                |
| Carbazole                    | N.D.                | 33.                | 170              | ug/kg               | 93              |                  | 83-111                 |            |                |
| 4-Chloro-3-methylphenol      | N.D.                | 67.                | 170              | ug/kg               | 97              |                  | 74-119                 |            |                |
| 4-Chloroaniline              | N.D.                | 67.                | 170              | ug/kg               | 68              |                  | 10-97                  |            |                |
| bis(2-Chloroethoxy)methane   | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 82-113                 |            |                |
| bis(2-Chloroethyl) ether     | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 77-115                 |            |                |
| 2-Chloronaphthalene          | N.D.                | 33.                | 170              | ug/kg               | 66              |                  | 59-139                 |            |                |
| 2-Chlorophenol               | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 83-119                 |            |                |
| 4-Chlorophenyl-phenylether   | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 79-110                 |            |                |
| 2,2'-oxybis(1-Chloropropane) | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 67-130                 |            |                |
| Chrysene                     | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 81-111                 |            |                |
| Dibenz(a,h)anthracene        | N.D.                | 33.                | 170              | ug/kg               | 100             |                  | 67-129                 |            |                |
| Dibenzofuran                 | N.D.                | 33.                | 170              | ug/kg               | 95              |                  | 85-110                 |            |                |
| 3,3'-Dichlorobenzidine       | N.D.                | 100.               | 330              | ug/kg               | 75              |                  | 35-94                  |            |                |
| 2,4-Dichlorophenol           | N.D.                | 33.                | 170              | ug/kg               | 96              |                  | 87-117                 |            |                |
| Diethylphthalate             | N.D.                | 67.                | 170              | ug/kg               | 91              |                  | 82-113                 |            |                |
| 2,4-Dimethylphenol           | N.D.                | 67.                | 170              | ug/kg               | 99              |                  | 83-120                 |            |                |
| Dimethylphthalate            | N.D.                | 67.                | 170              | ug/kg               | 93              |                  | 85-111                 |            |                |
| 4,6-Dinitro-2-methylphenol   | N.D.                | 170.               | 500              | ug/kg               | 90              |                  | 60-113                 |            |                |
| 2,4-Dinitrophenol            | N.D.                | 330.               | 1,000            | ug/kg               | 81              |                  | 51-124                 |            |                |
| 2,4-Dinitrotoluene           | N.D.                | 67.                | 170              | ug/kg               | 94              |                  | 80-116                 |            |                |
| 2,6-Dinitrotoluene           | N.D.                | 33.                | 170              | ug/kg               | 91              |                  | 79-115                 |            |                |
| bis(2-Ethylhexyl)phthalate   | N.D.                | 67.                | 330              | ug/kg               | 99              |                  | 80-119                 |            |                |
| Fluoranthene                 | N.D.                | 33.                | 170              | ug/kg               | 93              |                  | 80-113                 |            |                |
| Fluorene                     | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 81-117                 |            |                |
| Hexachlorobenzene            | N.D.                | 33.                | 170              | ug/kg               | 97              |                  | 79-115                 |            |                |
| Hexachlorobutadiene          | N.D.                | 67.                | 170              | ug/kg               | 90              |                  | 70-112                 |            |                |
| Hexachlorocyclopentadiene    | N.D.                | 170.               | 500              | ug/kg               | 95              |                  | 64-127                 |            |                |
| Hexachloroethane             | N.D.                | 33.                | 170              | ug/kg               | 88              |                  | 76-109                 |            |                |
| Indeno(1,2,3-cd)pyrene       | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 64-128                 |            |                |
| Isophorone                   | N.D.                | 33.                | 170              | ug/kg               | 99              |                  | 72-107                 |            |                |
| 2-Methylnaphthalene          | N.D.                | 33.                | 170              | ug/kg               | 89              |                  | 79-110                 |            |                |
| 2-Methylphenol               | N.D.                | 67.                | 170              | ug/kg               | 96              |                  | 80-119                 |            |                |
| 4-Methylphenol               | N.D.                | 67.                | 170              | ug/kg               | 92              |                  | 74-116                 |            |                |
| Naphthalene                  | N.D.                | 33.                | 170              | ug/kg               | 91              |                  | 83-112                 |            |                |
| 2-Nitroaniline               | N.D.                | 33.                | 170              | ug/kg               | 98              |                  | 83-118                 |            |                |
| 3-Nitroaniline               | N.D.                | 67.                | 170              | ug/kg               | 95              |                  | 66-114                 |            |                |
| 4-Nitroaniline               | N.D.                | 67.                | 170              | ug/kg               | 74              |                  | 52-92                  |            |                |
| Nitrobenzene                 | N.D.                | 33.                | 170              | ug/kg               | 99              |                  | 78-122                 |            |                |
| 2-Nitrophenol                | N.D.                | 33.                | 170              | ug/kg               | 93              |                  | 81-114                 |            |                |
| 4-Nitrophenol                | N.D.                | 170.               | 500              | ug/kg               | 88              |                  | 57-131                 |            |                |
| N-Nitroso-di-n-propylamine   | N.D.                | 33.                | 170              | ug/kg               | 99              |                  | 70-113                 |            |                |
| N-Nitrosodiphenylamine       | N.D.                | 33.                | 170              | ug/kg               | 101             |                  | 86-112                 |            |                |
| Di-n-octylphthalate          | N.D.                | 67.                | 170              | ug/kg               | 113             |                  | 65-141                 |            |                |
| Pentachlorophenol            | N.D.                | 170.               | 500              | ug/kg               | 93              |                  | 50-133                 |            |                |
| Phenanthrene                 | N.D.                | 33.                | 170              | ug/kg               | 94              |                  | 83-109                 |            |                |
| Phenol                       | N.D.                | 33.                | 170              | ug/kg               | 91              |                  | 74-115                 |            |                |
| Pyrene                       | N.D.                | 33.                | 170              | ug/kg               | 105             |                  | 80-121                 |            |                |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>  | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-----------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| 2,4,5-Trichlorophenol | N.D.                | 67.                | 170              | ug/kg               | 94              |                  | 84-109                 |            |                |
| 2,4,6-Trichlorophenol | N.D.                | 33.                | 170              | ug/kg               | 102             |                  | 88-114                 |            |                |

Batch number: 111115708001

Sample number(s): 6262260-6262269

|           |      |        |       |       |     |  |        |  |  |
|-----------|------|--------|-------|-------|-----|--|--------|--|--|
| Aluminum  | N.D. | 4.79   | 19.0  | mg/kg | 88  |  | 61-110 |  |  |
| Antimony  | N.D. | 0.952  | 1.90  | mg/kg | 56  |  | 38-150 |  |  |
| Arsenic   | N.D. | 0.905  | 1.90  | mg/kg | 97  |  | 90-110 |  |  |
| Barium    | N.D. | 0.0381 | 0.476 | mg/kg | 103 |  | 90-117 |  |  |
| Beryllium | N.D. | 0.0648 | 0.476 | mg/kg | 98  |  | 87-110 |  |  |
| Cadmium   | N.D. | 0.133  | 0.476 | mg/kg | 97  |  | 90-114 |  |  |
| Calcium   | N.D. | 5.84   | 19.0  | mg/kg | 97  |  | 88-110 |  |  |
| Chromium  | N.D. | 0.562  | 1.43  | mg/kg | 92  |  | 85-110 |  |  |
| Cobalt    | N.D. | 0.181  | 0.476 | mg/kg | 99  |  | 90-114 |  |  |
| Copper    | N.D. | 0.210  | 0.952 | mg/kg | 97  |  | 83-112 |  |  |
| Iron      | N.D. | 4.49   | 19.0  | mg/kg | 85  |  | 61-110 |  |  |
| Lead      | N.D. | 0.571  | 1.43  | mg/kg | 97  |  | 80-120 |  |  |
| Magnesium | N.D. | 2.42   | 9.52  | mg/kg | 93  |  | 82-110 |  |  |
| Manganese | N.D. | 0.0743 | 0.476 | mg/kg | 102 |  | 89-112 |  |  |
| Nickel    | N.D. | 0.181  | 0.952 | mg/kg | 98  |  | 90-114 |  |  |
| Potassium | N.D. | 17.1   | 47.6  | mg/kg | 93  |  | 78-110 |  |  |
| Selenium  | N.D. | 0.933  | 1.90  | mg/kg | 97  |  | 57-110 |  |  |
| Silver    | N.D. | 0.171  | 0.476 | mg/kg | 99  |  | 86-111 |  |  |
| Sodium    | N.D. | 35.5   | 95.2  | mg/kg | 90  |  | 87-110 |  |  |
| Thallium  | N.D. | 1.38   | 2.86  | mg/kg | 101 |  | 90-116 |  |  |
| Vanadium  | N.D. | 0.181  | 0.476 | mg/kg | 93  |  | 79-110 |  |  |
| Zinc      | N.D. | 0.629  | 1.90  | mg/kg | 93  |  | 90-110 |  |  |

Batch number: 111115711001

Sample number(s): 6262260-6262269

|         |      |        |       |       |    |  |        |  |  |
|---------|------|--------|-------|-------|----|--|--------|--|--|
| Mercury | N.D. | 0.0029 | 0.100 | mg/kg | 96 |  | 88-123 |  |  |
|---------|------|--------|-------|-------|----|--|--------|--|--|

Batch number: 111125708002

Sample number(s): 6262270-6262274

|           |          |        |       |       |     |  |        |  |  |
|-----------|----------|--------|-------|-------|-----|--|--------|--|--|
| Aluminum  | N.D.     | 5.03   | 20.0  | mg/kg | 92  |  | 61-110 |  |  |
| Antimony  | N.D.     | 1.00   | 2.00  | mg/kg | 94  |  | 38-150 |  |  |
| Arsenic   | N.D.     | 0.950  | 2.00  | mg/kg | 97  |  | 90-110 |  |  |
| Barium    | N.D.     | 0.0400 | 0.500 | mg/kg | 101 |  | 90-117 |  |  |
| Beryllium | N.D.     | 0.0680 | 0.500 | mg/kg | 97  |  | 87-110 |  |  |
| Cadmium   | N.D.     | 0.140  | 0.500 | mg/kg | 97  |  | 90-114 |  |  |
| Calcium   | N.D.     | 6.13   | 20.0  | mg/kg | 100 |  | 88-110 |  |  |
| Chromium  | N.D.     | 0.590  | 1.50  | mg/kg | 97  |  | 85-110 |  |  |
| Cobalt    | N.D.     | 0.190  | 0.500 | mg/kg | 100 |  | 90-114 |  |  |
| Copper    | N.D.     | 0.220  | 1.00  | mg/kg | 99  |  | 83-112 |  |  |
| Iron      | N.D.     | 4.71   | 20.0  | mg/kg | 99  |  | 61-110 |  |  |
| Lead      | N.D.     | 0.600  | 1.50  | mg/kg | 100 |  | 80-120 |  |  |
| Magnesium | N.D.     | 2.54   | 10.0  | mg/kg | 98  |  | 82-110 |  |  |
| Manganese | 0.0810 J | 0.0780 | 0.500 | mg/kg | 101 |  | 89-112 |  |  |
| Nickel    | N.D.     | 0.190  | 1.00  | mg/kg | 99  |  | 90-114 |  |  |
| Potassium | N.D.     | 18.0   | 50.0  | mg/kg | 95  |  | 78-110 |  |  |
| Selenium  | N.D.     | 0.980  | 2.00  | mg/kg | 96  |  | 57-110 |  |  |
| Silver    | N.D.     | 0.180  | 0.500 | mg/kg | 101 |  | 86-111 |  |  |
| Sodium    | N.D.     | 37.3   | 100   | mg/kg | 94  |  | 87-110 |  |  |
| Thallium  | N.D.     | 1.45   | 3.00  | mg/kg | 103 |  | 90-116 |  |  |
| Vanadium  | N.D.     | 0.190  | 0.500 | mg/kg | 97  |  | 79-110 |  |  |
| Zinc      | N.D.     | 0.660  | 2.00  | mg/kg | 95  |  | 90-110 |  |  |

Batch number: 111125708004

Sample number(s): 6262277-6262296

|          |      |       |      |       |     |  |        |  |  |
|----------|------|-------|------|-------|-----|--|--------|--|--|
| Aluminum | N.D. | 5.03  | 20.0 | mg/kg | 93  |  | 61-110 |  |  |
| Antimony | N.D. | 1.00  | 2.00 | mg/kg | 55  |  | 38-150 |  |  |
| Arsenic  | N.D. | 0.950 | 2.00 | mg/kg | 100 |  | 90-110 |  |  |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u> | <u>Blank Result</u> | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Barium               | N.D.                | 0.0400             | 0.500            | mg/kg               | 106             |                  | 90-117                 |            |                |
| Beryllium            | N.D.                | 0.0680             | 0.500            | mg/kg               | 99              |                  | 87-110                 |            |                |
| Cadmium              | N.D.                | 0.140              | 0.500            | mg/kg               | 99              |                  | 90-114                 |            |                |
| Calcium              | N.D.                | 6.13               | 20.0             | mg/kg               | 101             |                  | 88-110                 |            |                |
| Chromium             | N.D.                | 0.590              | 1.50             | mg/kg               | 94              |                  | 85-110                 |            |                |
| Cobalt               | N.D.                | 0.190              | 0.500            | mg/kg               | 102             |                  | 90-114                 |            |                |
| Copper               | N.D.                | 0.220              | 1.00             | mg/kg               | 100             |                  | 83-112                 |            |                |
| Iron                 | N.D.                | 4.71               | 20.0             | mg/kg               | 90              |                  | 61-110                 |            |                |
| Lead                 | N.D.                | 0.600              | 1.50             | mg/kg               | 100             |                  | 80-120                 |            |                |
| Magnesium            | N.D.                | 2.54               | 10.0             | mg/kg               | 100             |                  | 82-110                 |            |                |
| Manganese            | N.D.                | 0.0780             | 0.500            | mg/kg               | 103             |                  | 89-112                 |            |                |
| Nickel               | N.D.                | 0.190              | 1.00             | mg/kg               | 101             |                  | 90-114                 |            |                |
| Potassium            | N.D.                | 18.0               | 50.0             | mg/kg               | 98              |                  | 78-110                 |            |                |
| Selenium             | N.D.                | 0.980              | 2.00             | mg/kg               | 94              |                  | 57-110                 |            |                |
| Silver               | N.D.                | 0.180              | 0.500            | mg/kg               | 101             |                  | 86-111                 |            |                |
| Sodium               | N.D.                | 37.3               | 100              | mg/kg               | 97              |                  | 87-110                 |            |                |
| Thallium             | N.D.                | 1.45               | 3.00             | mg/kg               | 102             |                  | 90-116                 |            |                |
| Vanadium             | N.D.                | 0.190              | 0.500            | mg/kg               | 95              |                  | 79-110                 |            |                |
| Zinc                 | N.D.                | 0.660              | 2.00             | mg/kg               | 98              |                  | 90-110                 |            |                |

Batch number: 111125708006

Sample number(s): 6262275-6262276

|           |        |        |       |       |     |  |        |  |  |
|-----------|--------|--------|-------|-------|-----|--|--------|--|--|
| Aluminum  | N.D.   | 5.03   | 20.0  | mg/kg | 101 |  | 61-110 |  |  |
| Antimony  | N.D.   | 1.00   | 2.00  | mg/kg | 52  |  | 38-150 |  |  |
| Arsenic   | N.D.   | 0.950  | 2.00  | mg/kg | 99  |  | 90-110 |  |  |
| Barium    | N.D.   | 0.0400 | 0.500 | mg/kg | 99  |  | 90-117 |  |  |
| Beryllium | N.D.   | 0.0680 | 0.500 | mg/kg | 95  |  | 87-110 |  |  |
| Cadmium   | N.D.   | 0.140  | 0.500 | mg/kg | 100 |  | 90-114 |  |  |
| Calcium   | N.D. J | 6.13   | 20.0  | mg/kg | 97  |  | 88-110 |  |  |
| Chromium  | N.D.   | 0.590  | 1.50  | mg/kg | 96  |  | 85-110 |  |  |
| Cobalt    | N.D.   | 0.190  | 0.500 | mg/kg | 101 |  | 90-114 |  |  |
| Copper    | N.D.   | 0.220  | 1.00  | mg/kg | 99  |  | 83-112 |  |  |
| Iron      | N.D.   | 4.71   | 20.0  | mg/kg | 91  |  | 61-110 |  |  |
| Lead      | N.D.   | 0.600  | 1.50  | mg/kg | 97  |  | 80-120 |  |  |
| Magnesium | N.D.   | 2.54   | 10.0  | mg/kg | 100 |  | 82-110 |  |  |
| Manganese | N.D.   | 0.0780 | 0.500 | mg/kg | 100 |  | 89-112 |  |  |
| Nickel    | N.D.   | 0.190  | 1.00  | mg/kg | 100 |  | 90-114 |  |  |
| Potassium | N.D.   | 18.0   | 50.0  | mg/kg | 99  |  | 78-110 |  |  |
| Selenium  | N.D.   | 0.980  | 2.00  | mg/kg | 97  |  | 57-110 |  |  |
| Silver    | N.D.   | 0.180  | 0.500 | mg/kg | 101 |  | 86-111 |  |  |
| Sodium    | N.D.   | 37.3   | 100   | mg/kg | 94  |  | 87-110 |  |  |
| Thallium  | N.D.   | 1.45   | 3.00  | mg/kg | 105 |  | 90-116 |  |  |
| Vanadium  | N.D.   | 0.190  | 0.500 | mg/kg | 95  |  | 79-110 |  |  |
| Zinc      | N.D.   | 0.660  | 2.00  | mg/kg | 98  |  | 90-110 |  |  |

Batch number: 111125711004

Sample number(s): 6262277-6262296

|         |      |        |        |       |    |  |        |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|
| Mercury | N.D. | 0.0028 | 0.0983 | mg/kg | 97 |  | 88-123 |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|

Batch number: 111125711006

Sample number(s): 6262275-6262276

|         |      |        |        |       |    |  |        |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|
| Mercury | N.D. | 0.0028 | 0.0963 | mg/kg | 99 |  | 88-123 |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|

Batch number: 111155711002

Sample number(s): 6262270-6262274

|         |      |        |        |       |    |  |        |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|
| Mercury | N.D. | 0.0027 | 0.0954 | mg/kg | 95 |  | 88-123 |  |  |
|---------|------|--------|--------|-------|----|--|--------|--|--|

Batch number: 11112820001A

Sample number(s): 6262280-6262285

|          |  |  |  |  |     |  |        |  |  |
|----------|--|--|--|--|-----|--|--------|--|--|
| Moisture |  |  |  |  | 100 |  | 99-101 |  |  |
|----------|--|--|--|--|-----|--|--------|--|--|

Batch number: 11112820001B

Sample number(s): 6262286-6262296

|          |  |  |  |  |     |  |        |  |  |
|----------|--|--|--|--|-----|--|--------|--|--|
| Moisture |  |  |  |  | 100 |  | 99-101 |  |  |
|----------|--|--|--|--|-----|--|--------|--|--|

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

| <u>Analysis Name</u>                   | <u>Blank Result</u>               | <u>Blank MDL**</u> | <u>Blank LOQ</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Batch number: 11112820002A<br>Moisture | Sample number(s): 6262260-6262269 |                    |                  |                     | 100             |                  | 99-101                 |            |                |
| Batch number: 11112820002B<br>Moisture | Sample number(s): 6262270-6262279 |                    |                  |                     | 100             |                  | 99-101                 |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>         | <u>MS %REC</u>                                   | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|------------------------------|--------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: 11110SLA026    | Sample number(s): 6262260-6262269 UNSPK: 6262260 |                 |                      |            |                |                 |                 |                |                    |
| Acenaphthene                 | 97                                               | 97              | 51-135               | 1          | 30             |                 |                 |                |                    |
| Acenaphthylene               | 102                                              | 103             | 47-137               | 1          | 30             |                 |                 |                |                    |
| Acetophenone                 | 99                                               | 99              | 38-136               | 1          | 30             |                 |                 |                |                    |
| Anthracene                   | 96                                               | 98              | 40-147               | 2          | 30             |                 |                 |                |                    |
| Atrazine                     | 98                                               | 97              | 52-124               | 0          | 30             |                 |                 |                |                    |
| Benzaldehyde                 | 35                                               | 37              | 10-85                | 4          | 30             |                 |                 |                |                    |
| Benzo(a)anthracene           | 97                                               | 100             | 32-150               | 3          | 30             |                 |                 |                |                    |
| Benzo(a)pyrene               | 86                                               | 88              | 57-129               | 3          | 30             |                 |                 |                |                    |
| Benzo(b)fluoranthene         | 87                                               | 90              | 53-131               | 4          | 30             |                 |                 |                |                    |
| Benzo(g,h,i)perylene         | 86                                               | 89              | 60-123               | 3          | 30             |                 |                 |                |                    |
| Benzo(k)fluoranthene         | 86                                               | 87              | 61-131               | 1          | 30             |                 |                 |                |                    |
| 1,1'-Biphenyl                | 97                                               | 100             | 51-127               | 3          | 30             |                 |                 |                |                    |
| 4-Bromophenyl-phenylether    | 97                                               | 99              | 58-136               | 2          | 30             |                 |                 |                |                    |
| Butylbenzylphthalate         | 107                                              | 111             | 42-155               | 4          | 30             |                 |                 |                |                    |
| Di-n-butylphthalate          | 98                                               | 99              | 55-131               | 1          | 30             |                 |                 |                |                    |
| Caprolactam                  | 64                                               | 90              | 36-137               | 34*        | 30             |                 |                 |                |                    |
| Carbazole                    | 96                                               | 96              | 36-148               | 0          | 30             |                 |                 |                |                    |
| 4-Chloro-3-methylphenol      | 101                                              | 101             | 33-144               | 0          | 30             |                 |                 |                |                    |
| 4-Chloroaniline              | 86                                               | 89              | 11-114               | 3          | 30             |                 |                 |                |                    |
| bis(2-Chloroethoxy)methane   | 101                                              | 104             | 60-118               | 3          | 30             |                 |                 |                |                    |
| bis(2-Chloroethyl)ether      | 103                                              | 103             | 45-139               | 0          | 30             |                 |                 |                |                    |
| 2-Chloronaphthalene          | 69                                               | 73              | 43-149               | 5          | 30             |                 |                 |                |                    |
| 2-Chlorophenol               | 104                                              | 105             | 53-141               | 1          | 30             |                 |                 |                |                    |
| 4-Chlorophenyl-phenylether   | 96                                               | 96              | 57-127               | 0          | 30             |                 |                 |                |                    |
| 2,2'-oxybis(1-Chloropropane) | 98                                               | 99              | 51-124               | 0          | 30             |                 |                 |                |                    |
| Chrysene                     | 96                                               | 97              | 76-114               | 2          | 30             |                 |                 |                |                    |
| Dibenz(a,h)anthracene        | 86                                               | 90              | 37-151               | 4          | 30             |                 |                 |                |                    |
| Dibenzofuran                 | 98                                               | 98              | 38-148               | 0          | 30             |                 |                 |                |                    |
| 3,3'-Dichlorobenzidine       | 92                                               | 91              | 10-143               | 2          | 30             |                 |                 |                |                    |
| 2,4-Dichlorophenol           | 103                                              | 103             | 48-141               | 0          | 30             |                 |                 |                |                    |
| Diethylphthalate             | 95                                               | 95              | 52-130               | 0          | 30             |                 |                 |                |                    |
| 2,4-Dimethylphenol           | 93                                               | 93              | 27-143               | 0          | 30             |                 |                 |                |                    |
| Dimethylphthalate            | 96                                               | 97              | 49-134               | 1          | 30             |                 |                 |                |                    |
| 4,6-Dinitro-2-methylphenol   | 66                                               | 102             | 10-148               | 42*        | 30             |                 |                 |                |                    |
| 2,4-Dinitrophenol            | 40                                               | 98              | 20-143               | 85*        | 30             |                 |                 |                |                    |
| 2,4-Dinitrotoluene           | 97                                               | 96              | 27-147               | 1          | 30             |                 |                 |                |                    |
| 2,6-Dinitrotoluene           | 96                                               | 97              | 44-140               | 1          | 30             |                 |                 |                |                    |
| bis(2-Ethylhexyl)phthalate   | 108                                              | 110             | 38-151               | 2          | 30             |                 |                 |                |                    |
| Fluoranthene                 | 97                                               | 96              | 48-122               | 1          | 30             |                 |                 |                |                    |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name              | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|----------------------------|------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|
| Fluorene                   | 97         | 97          | 46-137           | 0   | 30         |             |             |            |                |
| Hexachlorobenzene          | 92         | 97          | 53-137           | 5   | 30         |             |             |            |                |
| Hexachlorobutadiene        | 91         | 94          | 52-124           | 3   | 30         |             |             |            |                |
| Hexachlorocyclopentadiene  | 83         | 86          | 10-153           | 3   | 30         |             |             |            |                |
| Hexachloroethane           | 89         | 90          | 71-104           | 1   | 30         |             |             |            |                |
| Indeno (1,2,3-cd)pyrene    | 86         | 89          | 61-123           | 3   | 30         |             |             |            |                |
| Isophorone                 | 102        | 104         | 54-122           | 3   | 30         |             |             |            |                |
| 2-Methylnaphthalene        | 95         | 93          | 34-139           | 3   | 30         |             |             |            |                |
| 2-Methylphenol             | 98         | 97          | 30-145           | 2   | 30         |             |             |            |                |
| 4-Methylphenol             | 103        | 99          | 36-149           | 3   | 30         |             |             |            |                |
| Naphthalene                | 96         | 97          | 52-132           | 0   | 30         |             |             |            |                |
| 2-Nitroaniline             | 99         | 102         | 46-146           | 3   | 30         |             |             |            |                |
| 3-Nitroaniline             | 98         | 96          | 34-134           | 2   | 30         |             |             |            |                |
| 4-Nitroaniline             | 86         | 86          | 26-124           | 0   | 30         |             |             |            |                |
| Nitrobenzene               | 104        | 107         | 37-139           | 3   | 30         |             |             |            |                |
| 2-Nitrophenol              | 101        | 99          | 25-151           | 2   | 30         |             |             |            |                |
| 4-Nitrophenol              | 97         | 100         | 15-149           | 3   | 30         |             |             |            |                |
| N-Nitroso-di-n-propylamine | 105        | 103         | 46-128           | 1   | 30         |             |             |            |                |
| N-Nitrosodiphenylamine     | 103        | 104         | 33-148           | 1   | 30         |             |             |            |                |
| Di-n-octylphthalate        | 100        | 102         | 43-149           | 2   | 30         |             |             |            |                |
| Pentachlorophenol          | 92         | 99          | 23-145           | 8   | 30         |             |             |            |                |
| Phenanthrene               | 97         | 98          | 34-147           | 1   | 30         |             |             |            |                |
| Phenol                     | 97         | 97          | 39-151           | 1   | 30         |             |             |            |                |
| Pyrene                     | 106        | 109         | 76-124           | 3   | 30         |             |             |            |                |
| 2,4,5-Trichlorophenol      | 98         | 97          | 25-143           | 1   | 30         |             |             |            |                |
| 2,4,6-Trichlorophenol      | 99         | 100         | 41-142           | 1   | 30         |             |             |            |                |

|                              |                                                  |       |        |      |    |
|------------------------------|--------------------------------------------------|-------|--------|------|----|
| Batch number: 11110SLD026    | Sample number(s): 6262270-6262289 UNSPK: 6262270 |       |        |      |    |
| Acenaphthene                 | -96*                                             | -6*   | 51-135 | 40*  | 30 |
| Acenaphthylene               | 0*                                               | 109   | 47-137 | 200* | 30 |
| Acetophenone                 | 0*                                               | 225*  | 38-136 | 200* | 30 |
| Anthracene                   | 0*                                               | -1*   | 40-147 | 200* | 30 |
| Atrazine                     | 0*                                               | 0*    | 52-124 | 0    | 30 |
| Benzaldehyde                 | 0*                                               | 0*    | 10-85  | 0    | 30 |
| Benzo(a)anthracene           | -29*                                             | -15*  | 32-150 | 10   | 30 |
| Benzo(a)pyrene               | 0*                                               | 110   | 57-129 | 200* | 30 |
| Benzo(b)fluoranthene         | 0*                                               | 116   | 53-131 | 200* | 30 |
| Benzo(g,h,i)perylene         | 0*                                               | 128*  | 60-123 | 200* | 30 |
| Benzo(k)fluoranthene         | 0*                                               | 0*    | 61-131 | 0    | 30 |
| 1,1'-Biphenyl                | -117*                                            | -50*  | 51-127 | 29   | 30 |
| 4-Bromophenyl-phenylether    | 0*                                               | 0*    | 58-136 | 0    | 30 |
| Butylbenzylphthalate         | 0*                                               | 0*    | 42-155 | 0    | 30 |
| Di-n-butylphthalate          | 0*                                               | 0*    | 55-131 | 0    | 30 |
| Caprolactam                  | 987*                                             | 1176* | 36-137 | 17   | 30 |
| Carbazole                    | 0*                                               | 0*    | 36-148 | 0    | 30 |
| 4-Chloro-3-methylphenol      | 0*                                               | 0*    | 33-144 | 0    | 30 |
| 4-Chloroaniline              | 0*                                               | 0*    | 11-114 | 0    | 30 |
| bis(2-Chloroethoxy)methane   | 0*                                               | 0*    | 60-118 | 0    | 30 |
| bis(2-Chloroethyl)ether      | 0*                                               | 0*    | 45-139 | 0    | 30 |
| 2-Chloronaphthalene          | 0*                                               | 0*    | 43-149 | 0    | 30 |
| 2-Chlorophenol               | 0*                                               | 0*    | 53-141 | 0    | 30 |
| 4-Chlorophenyl-phenylether   | 0*                                               | 0*    | 57-127 | 0    | 30 |
| 2,2'-oxybis(1-Chloropropane) | 0*                                               | 113   | 51-124 | 200* | 30 |

\*- Outside of specification

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(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>                                                                 | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|--------------------------------------------------------------------------------------|--------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Chrysene                                                                             | -320<br>(2)              | -196<br>(2)               | 76-114                         | 27         | 30                       |                           |                           |                          |                              |
| Dibenz(a,h)anthracene                                                                | 0*                       | 0*                        | 37-151                         | 0          | 30                       |                           |                           |                          |                              |
| Dibenzofuran                                                                         | 163*                     | 185*                      | 38-148                         | 13         | 30                       |                           |                           |                          |                              |
| 3,3'-Dichlorobenzidine                                                               | 0*                       | 0*                        | 10-143                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dichlorophenol                                                                   | 147*                     | 166*                      | 48-141                         | 12         | 30                       |                           |                           |                          |                              |
| Diethylphthalate                                                                     | 0*                       | 0*                        | 52-130                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dimethylphenol                                                                   | 0*                       | 0*                        | 27-143                         | 0          | 30                       |                           |                           |                          |                              |
| Dimethylphthalate                                                                    | 0*                       | 0*                        | 49-134                         | 0          | 30                       |                           |                           |                          |                              |
| 4,6-Dinitro-2-methylphenol                                                           | 0*                       | 0*                        | 10-148                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrophenol                                                                    | 0 (2)                    | 0 (2)                     | 20-143                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrotoluene                                                                   | 0*                       | 306*                      | 27-147                         | 200*       | 30                       |                           |                           |                          |                              |
| 2,6-Dinitrotoluene                                                                   | 0*                       | 0*                        | 44-140                         | 0          | 30                       |                           |                           |                          |                              |
| bis(2-Ethylhexyl)phthalate                                                           | 0*                       | 203*                      | 38-151                         | 200*       | 30                       |                           |                           |                          |                              |
| Fluoranthene                                                                         | 135*                     | 179*                      | 48-122                         | 28         | 30                       |                           |                           |                          |                              |
| Fluorene                                                                             | -160<br>(2)              | -90 (2)                   | 46-137                         | 24         | 30                       |                           |                           |                          |                              |
| Hexachlorobenzene                                                                    | 0*                       | 0*                        | 53-137                         | 0          | 30                       |                           |                           |                          |                              |
| Hexachlorobutadiene                                                                  | 0*                       | 0*                        | 52-124                         | 0          | 30                       |                           |                           |                          |                              |
| Hexachlorocyclopentadiene                                                            | 0*                       | 0*                        | 10-153                         | 0          | 30                       |                           |                           |                          |                              |
| Hexachloroethane                                                                     | 634*                     | 850*                      | 71-104                         | 29         | 30                       |                           |                           |                          |                              |
| Indeno(1,2,3-cd)pyrene                                                               | 0*                       | 0*                        | 61-123                         | 0          | 30                       |                           |                           |                          |                              |
| Isophorone                                                                           | 105                      | 0*                        | 54-122                         | 200*       | 30                       |                           |                           |                          |                              |
| 2-Methylnaphthalene                                                                  | -2614<br>(2)             | -1871<br>(2)              | 34-139                         | 23         | 30                       |                           |                           |                          |                              |
| 2-Methylphenol                                                                       | 0*                       | 0*                        | 30-145                         | 0          | 30                       |                           |                           |                          |                              |
| 4-Methylphenol                                                                       | 0*                       | 0*                        | 36-149                         | 0          | 30                       |                           |                           |                          |                              |
| Naphthalene                                                                          | -567<br>(2)              | -397<br>(2)               | 52-132                         | 20         | 30                       |                           |                           |                          |                              |
| 2-Nitroaniline                                                                       | 0*                       | 0*                        | 46-146                         | 0          | 30                       |                           |                           |                          |                              |
| 3-Nitroaniline                                                                       | 0*                       | 0*                        | 34-134                         | 0          | 30                       |                           |                           |                          |                              |
| 4-Nitroaniline                                                                       | 0*                       | 0*                        | 26-124                         | 0          | 30                       |                           |                           |                          |                              |
| Nitrobenzene                                                                         | 0*                       | 110                       | 37-139                         | 200*       | 30                       |                           |                           |                          |                              |
| 2-Nitrophenol                                                                        | 0*                       | 103                       | 25-151                         | 200*       | 30                       |                           |                           |                          |                              |
| 4-Nitrophenol                                                                        | 0*                       | 0*                        | 15-149                         | 0          | 30                       |                           |                           |                          |                              |
| N-Nitroso-di-n-propylamine                                                           | 0*                       | 0*                        | 46-128                         | 0          | 30                       |                           |                           |                          |                              |
| N-Nitrosodiphenylamine                                                               | -336<br>(2)              | -231<br>(2)               | 33-148                         | 23         | 30                       |                           |                           |                          |                              |
| Di-n-octylphthalate                                                                  | 0*                       | 0*                        | 43-149                         | 0          | 30                       |                           |                           |                          |                              |
| Pentachlorophenol                                                                    | 0*                       | 0*                        | 23-145                         | 0          | 30                       |                           |                           |                          |                              |
| Phenanthrene                                                                         | -544<br>(2)              | -359<br>(2)               | 34-147                         | 27         | 30                       |                           |                           |                          |                              |
| Phenol                                                                               | 0*                       | 0*                        | 39-151                         | 0          | 30                       |                           |                           |                          |                              |
| Pyrene                                                                               | -80*                     | -40*                      | 76-124                         | 23         | 30                       |                           |                           |                          |                              |
| 2,4,5-Trichlorophenol                                                                | 0*                       | 0*                        | 25-143                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4,6-Trichlorophenol                                                                | 0*                       | 0*                        | 41-142                         | 0          | 30                       |                           |                           |                          |                              |
| Batch number: 11111SLA026      Sample number(s): 6262290-6262296      UNSPK: 6262290 |                          |                           |                                |            |                          |                           |                           |                          |                              |
| Acenaphthene                                                                         | 48*                      | 70                        | 51-135                         | 39*        | 30                       |                           |                           |                          |                              |
| Acenaphthylene                                                                       | 55                       | 73                        | 47-137                         | 30         | 30                       |                           |                           |                          |                              |
| Acetophenone                                                                         | 58                       | 71                        | 38-136                         | 22         | 30                       |                           |                           |                          |                              |
| Anthracene                                                                           | 55                       | 75                        | 40-147                         | 33*        | 30                       |                           |                           |                          |                              |
| Atrazine                                                                             | 67                       | 74                        | 52-124                         | 10         | 30                       |                           |                           |                          |                              |

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## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>         | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|------------------------------|--------------------------|---------------------------|--------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Benzaldehyde                 | 34                       | 47                        | 10-85                          | 32*                      | 30                       |                           |                           |                          |                              |
| Benzo(a) anthracene          | 69                       | 76                        | 32-150                         | 11                       | 30                       |                           |                           |                          |                              |
| Benzo(a) pyrene              | 62                       | 74                        | 57-129                         | 14                       | 30                       |                           |                           |                          |                              |
| Benzo(b) fluoranthene        | 60                       | 66                        | 53-131                         | 9                        | 30                       |                           |                           |                          |                              |
| Benzo(g,h,i) perylene        | 48*                      | 64                        | 60-123                         | 21                       | 30                       |                           |                           |                          |                              |
| Benzo(k) fluoranthene        | 52*                      | 70                        | 61-131                         | 31*                      | 30                       |                           |                           |                          |                              |
| 1,1'-Biphenyl                | 51                       | 71                        | 51-127                         | 34*                      | 30                       |                           |                           |                          |                              |
| 4-Bromophenyl-phenylether    | 51*                      | 79                        | 58-136                         | 44*                      | 30                       |                           |                           |                          |                              |
| Butylbenzylphthalate         | 64                       | 83                        | 42-155                         | 26                       | 30                       |                           |                           |                          |                              |
| Di-n-butylphthalate          | 60                       | 72                        | 55-131                         | 19                       | 30                       |                           |                           |                          |                              |
| Caprolactam                  | 30*                      | 70                        | 36-137                         | 80*                      | 30                       |                           |                           |                          |                              |
| Carbazole                    | 63                       | 75                        | 36-148                         | 19                       | 30                       |                           |                           |                          |                              |
| 4-Chloro-3-methylphenol      | 56                       | 70                        | 33-144                         | 23                       | 30                       |                           |                           |                          |                              |
| 4-Chloroaniline              | 53                       | 61                        | 11-114                         | 16                       | 30                       |                           |                           |                          |                              |
| bis(2-Chloroethoxy)methane   | 63                       | 73                        | 60-118                         | 16                       | 30                       |                           |                           |                          |                              |
| bis(2-Chloroethyl) ether     | 59                       | 70                        | 45-139                         | 19                       | 30                       |                           |                           |                          |                              |
| 2-Chloronaphthalene          | 43                       | 60                        | 43-149                         | 35*                      | 30                       |                           |                           |                          |                              |
| 2-Chlorophenol               | 25*                      | 35*                       | 53-141                         | 33*                      | 30                       |                           |                           |                          |                              |
| 4-Chlorophenyl-phenylether   | 48*                      | 69                        | 57-127                         | 37*                      | 30                       |                           |                           |                          |                              |
| 2,2'-oxybis(1-Chloropropane) | 54                       | 75                        | 51-124                         | 34*                      | 30                       |                           |                           |                          |                              |
| Chrysene                     | 53*                      | 62*                       | 76-114                         | 11                       | 30                       |                           |                           |                          |                              |
| Dibenz(a,h) anthracene       | 60                       | 74                        | 37-151                         | 22                       | 30                       |                           |                           |                          |                              |
| Dibenzofuran                 | 52                       | 71                        | 38-148                         | 31*                      | 30                       |                           |                           |                          |                              |
| 3,3'-Dichlorobenzidine       | 46                       | 67                        | 10-143                         | 38*                      | 30                       |                           |                           |                          |                              |
| 2,4-Dichlorophenol           | 33*                      | 41*                       | 48-141                         | 22                       | 30                       |                           |                           |                          |                              |
| Diethylphthalate             | 56                       | 66                        | 52-130                         | 16                       | 30                       |                           |                           |                          |                              |
| 2,4-Dimethylphenol           | 63                       | 72                        | 27-143                         | 14                       | 30                       |                           |                           |                          |                              |
| Dimethylphthalate            | 54                       | 66                        | 49-134                         | 20                       | 30                       |                           |                           |                          |                              |
| 4,6-Dinitro-2-methylphenol   | 56                       | 0*                        | 10-148                         | 200*                     | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrophenol            | 0*                       | 0*                        | 20-143                         | 0                        | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrotoluene           | 49                       | 63                        | 27-147                         | 25                       | 30                       |                           |                           |                          |                              |
| 2,6-Dinitrotoluene           | 58                       | 73                        | 44-140                         | 24                       | 30                       |                           |                           |                          |                              |
| bis(2-Ethylhexyl) phthalate  | 57                       | 83                        | 38-151                         | 37*                      | 30                       |                           |                           |                          |                              |
| Fluoranthene                 | 70                       | 80                        | 48-122                         | 15                       | 30                       |                           |                           |                          |                              |
| Fluorene                     | 49                       | 69                        | 46-137                         | 36*                      | 30                       |                           |                           |                          |                              |
| Hexachlorobenzene            | 33*                      | 62                        | 53-137                         | 62*                      | 30                       |                           |                           |                          |                              |
| Hexachlorobutadiene          | 42*                      | 66                        | 52-124                         | 45*                      | 30                       |                           |                           |                          |                              |
| Hexachlorocyclopentadiene    | 0*                       | 0*                        | 10-153                         | 0                        | 30                       |                           |                           |                          |                              |
| Hexachloroethane             | 13*                      | 36*                       | 71-104                         | 96*                      | 30                       |                           |                           |                          |                              |
| Indeno(1,2,3-cd) pyrene      | 54*                      | 75                        | 61-123                         | 35*                      | 30                       |                           |                           |                          |                              |
| Isophorone                   | 59                       | 72                        | 54-122                         | 21                       | 30                       |                           |                           |                          |                              |
| 2-Methylnaphthalene          | 27*                      | 57                        | 34-139                         | 36*                      | 30                       |                           |                           |                          |                              |
| 2-Methylphenol               | 56                       | 68                        | 30-145                         | 20                       | 30                       |                           |                           |                          |                              |
| 4-Methylphenol               | 56                       | 62                        | 36-149                         | 13                       | 30                       |                           |                           |                          |                              |
| Naphthalene                  | 45*                      | 67                        | 52-132                         | 33*                      | 30                       |                           |                           |                          |                              |
| 2-Nitroaniline               | 72                       | 82                        | 46-146                         | 14                       | 30                       |                           |                           |                          |                              |
| 3-Nitroaniline               | 63                       | 82                        | 34-134                         | 28                       | 30                       |                           |                           |                          |                              |
| 4-Nitroaniline               | 75                       | 82                        | 26-124                         | 9                        | 30                       |                           |                           |                          |                              |
| Nitrobenzene                 | 65                       | 73                        | 37-139                         | 12                       | 30                       |                           |                           |                          |                              |
| 2-Nitrophenol                | 23*                      | 28                        | 25-151                         | 21                       | 30                       |                           |                           |                          |                              |
| 4-Nitrophenol                | 0*                       | 0*                        | 15-149                         | 0                        | 30                       |                           |                           |                          |                              |
| N-Nitroso-di-n-propylamine   | 61                       | 76                        | 46-128                         | 22                       | 30                       |                           |                           |                          |                              |
| N-Nitrosodiphenylamine       | 92                       | 129                       | 33-148                         | 35*                      | 30                       |                           |                           |                          |                              |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name                                                                            | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD<br>RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|------------------------------------------------------------------------------------------|------------|-------------|------------------|------------|------------|-------------|-------------|------------|----------------|
| Di-n-octylphthalate                                                                      | 52         | 81          | 43-149           | 44*        | 30         |             |             |            |                |
| Pentachlorophenol                                                                        | 0*         | 0*          | 23-145           | 0          | 30         |             |             |            |                |
| Phenanthrene                                                                             | 53         | 67          | 34-147           | 17         | 30         |             |             |            |                |
| Phenol                                                                                   | 52         | 61          | 39-151           | 17         | 30         |             |             |            |                |
| Pyrene                                                                                   | 51*        | 65*         | 76-124           | 17         | 30         |             |             |            |                |
| 2,4,5-Trichlorophenol                                                                    | 41         | 48          | 25-143           | 15         | 30         |             |             |            |                |
| 2,4,6-Trichlorophenol                                                                    | 38*        | 38*         | 41-142           | 2          | 30         |             |             |            |                |
| Batch number: 111115708001 Sample number(s): 6262260-6262269 UNSPK: 6262260 BKG: 6262260 |            |             |                  |            |            |             |             |            |                |
| Aluminum                                                                                 | 3274       | 2057        | 90-110           | 12         | 20         | 14,400      | 13,800      | 4          | 20             |
|                                                                                          | (2)        | (2)         |                  |            |            |             |             |            |                |
| Antimony                                                                                 | 49*        | 52*         | 75-125           | 8          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Arsenic                                                                                  | 92         | 87          | 75-125           | 2          | 20         | 6.71        | 5.55        | 19 (1)     | 20             |
| Barium                                                                                   | 100        | 96          | 75-125           | 2          | 20         | 68.6        | 66.1        | 4          | 20             |
| Beryllium                                                                                | 97         | 93          | 83-111           | 2          | 20         | 1.36        | 1.51        | 10 (1)     | 20             |
| Cadmium                                                                                  | 80         | 82          | 75-125           | 4          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Calcium                                                                                  | -1850      | 462 (2)     | 75-125           | 31*        | 20         | 31,600      | 35,000      | 10         | 20             |
|                                                                                          | (2)        |             |                  |            |            |             |             |            |                |
| Chromium                                                                                 | 105        | 104         | 75-125           | 1          | 20         | 17.7        | 15.7        | 12         | 20             |
| Cobalt                                                                                   | 88         | 85          | 78-113           | 1          | 20         | 9.24        | 8.45        | 9          | 20             |
| Copper                                                                                   | 105        | 89          | 75-125           | 8          | 20         | 21.5        | 23.1        | 7          | 20             |
| Iron                                                                                     | 851 (2)    | -2415       | 75-125           | 13         | 20         | 24,900      | 22,300      | 11         | 20             |
|                                                                                          | (2)        |             |                  |            |            |             |             |            |                |
| Lead                                                                                     | 77         | 59*         | 75-125           | 9          | 20         | 18.0        | 15.8        | 13         | 20             |
| Magnesium                                                                                | -2244      | 277 (2)     | 75-125           | 27*        | 20         | 20,200      | 22,200      | 10         | 20             |
|                                                                                          | (2)        |             |                  |            |            |             |             |            |                |
| Manganese                                                                                | 321 (2)    | -53 (2)     | 75-125           | 24*        | 20         | 683         | 731         | 7          | 20             |
| Nickel                                                                                   | 93         | 88          | 75-125           | 3          | 20         | 15.0        | 14.5        | 3          | 20             |
| Potassium                                                                                | 183*       | 167*        | 75-125           | 5          | 20         | 1,020       | 955         | 7          | 20             |
| Selenium                                                                                 | 83         | 80          | 75-125           | 2          | 20         | 1.65 J      | N.D.        | 200* (1)   | 20             |
| Silver                                                                                   | 87         | 89          | 75-125           | 4          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Sodium                                                                                   | 94         | 94          | 75-125           | 2          | 20         | 60.0 J      | 56.5 J      | 6 (1)      | 20             |
| Thallium                                                                                 | 82         | 83          | 75-125           | 3          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Vanadium                                                                                 | 102        | 98          | 75-125           | 2          | 20         | 28.1        | 26.9        | 4          | 20             |
| Zinc                                                                                     | 100        | 81          | 75-125           | 8          | 20         | 61.2        | 56.9        | 7          | 20             |
| Batch number: 111115711001 Sample number(s): 6262260-6262269 UNSPK: P261012 BKG: P261012 |            |             |                  |            |            |             |             |            |                |
| Mercury                                                                                  | 98         | 97          | 80-120           | 2          | 20         | 0.0269 J    | 0.0331 J    | 21* (1)    | 20             |
| Batch number: 111125708002 Sample number(s): 6262270-6262274 UNSPK: P260289 BKG: P260289 |            |             |                  |            |            |             |             |            |                |
| Aluminum                                                                                 | 4212       | 4154        | 90-110           | 1          | 20         | 14,100      | 13,700      | 3          | 20             |
|                                                                                          | (2)        | (2)         |                  |            |            |             |             |            |                |
| Antimony                                                                                 | 64*        | 65*         | 75-125           | 1          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Arsenic                                                                                  | 105        | 106         | 75-125           | 1          | 20         | 9.53        | 9.43        | 1 (1)      | 20             |
| Barium                                                                                   | 142*       | 139*        | 75-125           | 1          | 20         | 258         | 245         | 5          | 20             |
| Beryllium                                                                                | 104        | 105         | 83-111           | 1          | 20         | 0.681       | 0.655       | 4 (1)      | 20             |
| Cadmium                                                                                  | 92         | 93          | 75-125           | 0          | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Calcium                                                                                  | -133       | -126        | 75-125           | 0          | 20         | 22,100      | 21,200      | 4          | 20             |
|                                                                                          | (2)        | (2)         |                  |            |            |             |             |            |                |
| Chromium                                                                                 | 147*       | 150*        | 75-125           | 1          | 20         | 21.5        | 21.1        | 2          | 20             |
| Cobalt                                                                                   | 92         | 93          | 78-113           | 1          | 20         | 7.09        | 6.90        | 3          | 20             |
| Copper                                                                                   | 104        | 108         | 75-125           | 2          | 20         | 17.9        | 17.7        | 1          | 20             |
| Iron                                                                                     | 843 (2)    | 1143        | 75-125           | 1          | 20         | 18,700      | 18,200      | 3          | 20             |

\*- Outside of specification

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## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name                                                                            | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|------------------------------------------------------------------------------------------|------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|
|                                                                                          |            | (2)         |                  |     |            |             |             |            |                |
| Lead                                                                                     | 90         | 90          | 75-125           | 0   | 20         | 12.2        | 11.9        | 3          | 20             |
| Magnesium                                                                                | 341 (2)    | 390 (2)     | 75-125           | 1   | 20         | 8,400       | 8,160       | 3          | 20             |
| Manganese                                                                                | 84 (2)     | 84 (2)      | 75-125           | 0   | 20         | 271         | 263         | 3          | 20             |
| Nickel                                                                                   | 93         | 94          | 75-125           | 1   | 20         | 22.3        | 22.0        | 2          | 20             |
| Potassium                                                                                | 320*       | 316*        | 75-125           | 1   | 20         | 2,430       | 2,390       | 2          | 20             |
| Selenium                                                                                 | 90         | 90          | 75-125           | 0   | 20         | 2.65        | 2.16        | 20 (1)     | 20             |
| Silver                                                                                   | 114        | 116         | 75-125           | 1   | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Sodium                                                                                   | 91         | 97          | 75-125           | 1   | 20         | 3,270       | 3,160       | 4          | 20             |
| Thallium                                                                                 | 115        | 115         | 75-125           | 1   | 20         | 2.89 J      | 2.75 J      | 5 (1)      | 20             |
| Vanadium                                                                                 | 160*       | 159*        | 75-125           | 0   | 20         | 47.3        | 46.3        | 2          | 20             |
| Zinc                                                                                     | 98         | 102         | 75-125           | 1   | 20         | 69.7        | 68.6        | 2          | 20             |
| Batch number: 111125708004 Sample number(s): 6262277-6262296 UNSPK: 6262277 BKG: 6262277 |            |             |                  |     |            |             |             |            |                |
| Aluminum                                                                                 | 2996 (2)   | 3506 (2)    | 90-110           | 6   | 20         | 10,300      | 11,000      | 7          | 20             |
| Antimony                                                                                 | 55*        | 54*         | 75-125           | 3   | 20         | N.D.        | 1.08 J      | 200* (1)   | 20             |
| Arsenic                                                                                  | 107        | 110         | 75-125           | 2   | 20         | 11.9        | 12.8        | 7          | 20             |
| Barium                                                                                   | 107        | 106         | 75-125           | 1   | 20         | 163         | 166         | 2          | 20             |
| Beryllium                                                                                | 105        | 104         | 83-111           | 1   | 20         | 1.07        | 1.16        | 8 (1)      | 20             |
| Cadmium                                                                                  | 98         | 99          | 75-125           | 1   | 20         | 1.10        | 1.31        | 17 (1)     | 20             |
| Calcium                                                                                  | -35 (2)    | 52 (2)      | 75-125           | 11  | 20         | 2,920       | 2,240       | 26*        | 20             |
| Chromium                                                                                 | 124        | 133*        | 75-125           | 3   | 20         | 33.4        | 37.1        | 10         | 20             |
| Cobalt                                                                                   | 98         | 98          | 78-113           | 0   | 20         | 13.1        | 13.9        | 6          | 20             |
| Copper                                                                                   | 123        | 132*        | 75-125           | 2   | 20         | 72.2        | 78.6        | 8          | 20             |
| Iron                                                                                     | 949 (2)    | 1907 (2)    | 75-125           | 6   | 20         | 15,500      | 16,600      | 7          | 20             |
| Lead                                                                                     | 151 (2)    | 333 (2)     | 75-125           | 11  | 20         | 210         | 229         | 9          | 20             |
| Magnesium                                                                                | 167 (2)    | 277 (2)     | 75-125           | 8   | 20         | 2,380       | 2,260       | 5          | 20             |
| Manganese                                                                                | 124 (2)    | 136 (2)     | 75-125           | 2   | 20         | 281         | 295         | 5          | 20             |
| Nickel                                                                                   | 102        | 104         | 75-125           | 1   | 20         | 23.6        | 25.2        | 6          | 20             |
| Potassium                                                                                | 193*       | 205*        | 75-125           | 4   | 20         | 1,140       | 1,170       | 2          | 20             |
| Selenium                                                                                 | 96         | 96          | 75-125           | 0   | 20         | 2.37        | 2.00        | 17 (1)     | 20             |
| Silver                                                                                   | 96         | 97          | 75-125           | 1   | 20         | 0.345 J     | 0.473 J     | 31* (1)    | 20             |
| Sodium                                                                                   | 105        | 104         | 75-125           | 1   | 20         | 436         | 426         | 2 (1)      | 20             |
| Thallium                                                                                 | 93         | 93          | 75-125           | 0   | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Vanadium                                                                                 | 113        | 114         | 75-125           | 1   | 20         | 20.6        | 21.1        | 2          | 20             |
| Zinc                                                                                     | 131 (2)    | 183 (2)     | 75-125           | 7   | 20         | 304         | 341         | 12         | 20             |
| Batch number: 111125708006 Sample number(s): 6262275-6262276 UNSPK: P261350 BKG: P261350 |            |             |                  |     |            |             |             |            |                |
| Aluminum                                                                                 | 1183 (2)   | 1925 (2)    | 90-110           | 10  | 20         | 10,600      | 10,600      | 0          | 20             |
| Antimony                                                                                 | 79         | 74*         | 75-125           | 7   | 20         | N.D.        | 1.19 J      | 200* (1)   | 20             |
| Arsenic                                                                                  | 104        | 106         | 75-125           | 1   | 20         | 2.53        | 2.61        | 3 (1)      | 20             |
| Barium                                                                                   | 111        | 112         | 75-125           | 0   | 20         | 32.5        | 35.6        | 9          | 20             |
| Beryllium                                                                                | 110        | 110         | 83-111           | 1   | 20         | 0.229 J     | 0.234 J     | 2 (1)      | 20             |
| Cadmium                                                                                  | 103        | 102         | 75-125           | 2   | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Calcium                                                                                  | 134*       | 139*        | 75-125           | 2   | 20         | 155         | 152         | 2          | 20             |
| Chromium                                                                                 | 122        | 121         | 75-125           | 1   | 20         | 28.3        | 32.5        | 14         | 20             |
| Cobalt                                                                                   | 106        | 106         | 78-113           | 1   | 20         | 1.27        | 1.40        | 9 (1)      | 20             |
| Copper                                                                                   | 113        | 122         | 75-125           | 5   | 20         | 12.1        | 13.6        | 12         | 20             |
| Iron                                                                                     | 738 (2)    | 846 (2)     | 75-125           | 1   | 20         | 8,450       | 9,140       | 8          | 20             |
| Lead                                                                                     | 202*       | 221*        | 75-125           | 3   | 20         | 57.8        | 97.1        | 51*        | 20             |

\*- Outside of specification

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## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|---------------|------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|
| Magnesium     | 180 (2)    | 211 (2)     | 75-125           | 5   | 20         | 799         | 891         | 11         | 20             |
| Manganese     | 110        | 116         | 75-125           | 3   | 20         | 27.4        | 29.9        | 9          | 20             |
| Nickel        | 108        | 114         | 75-125           | 3   | 20         | 7.06        | 7.37        | 4          | 20             |
| Potassium     | 151*       | 162*        | 75-125           | 4   | 20         | 857         | 900         | 5          | 20             |
| Selenium      | 93         | 94          | 75-125           | 0   | 20         | 1.47 J      | N.D.        | 200* (1)   | 20             |
| Silver        | 118        | 119         | 75-125           | 0   | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Sodium        | 108        | 110         | 75-125           | 1   | 20         | N.D.        | N.D.        | 0 (1)      | 20             |
| Thallium      | 122        | 123         | 75-125           | 1   | 20         | 1.49 J      | 1.52 J      | 2 (1)      | 20             |
| Vanadium      | 114        | 116         | 75-125           | 0   | 20         | 17.2        | 18.3        | 7          | 20             |
| Zinc          | 107        | 108         | 75-125           | 1   | 20         | 13.0        | 13.9        | 6          | 20             |

Batch number: 111125711004 Sample number(s): 6262277-6262296 UNSPK: 6262279 BKG: 6262279  
Mercury -5841 -6808 80-120 35\* 20 15.0 16.7 11 (1) 20  
(2) (2)

Batch number: 111125711006 Sample number(s): 6262275-6262276 UNSPK: P261350 BKG: P261350  
Mercury -31\* -29\* 80-120 1 20 0.369 0.351 5 (1) 20

Batch number: 111155711002 Sample number(s): 6262270-6262274 UNSPK: 6262272 BKG: 6262272  
Mercury -194 331 (2) 80-120 44\* 20 1.81 1.18 42\* (1) 20  
(2)

Batch number: 11112820001A Sample number(s): 6262280-6262285 BKG: P258672  
Moisture 12.4 14.2 13 15

Batch number: 11112820001B Sample number(s): 6262286-6262296 BKG: 6262286  
Moisture 41.8 42.2 1 15

Batch number: 11112820002A Sample number(s): 6262260-6262269 BKG: 6262268  
Moisture 32.3 33.7 4 15

Batch number: 11112820002B Sample number(s): 6262270-6262279 BKG: 6262271  
Moisture 31.3 33.0 5 15

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed  
unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: Q111121AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6262261 | 84                   | 75                    | 67*        | 69*                  |
| 6262262 | 75                   | 73                    | 64*        | 63*                  |
| 6262264 | 79                   | 82                    | 63*        | 73                   |
| 6262266 | 90                   | 94                    | 81         | 81                   |
| 6262267 | 60*                  | 65*                   | 45*        | 48*                  |
| 6262268 | 74                   | 73                    | 65*        | 66*                  |
| 6262270 | 83                   | 85                    | 68*        | 74                   |

\*- Outside of specification

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## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Surrogate Quality Control

|         |     |     |     |     |
|---------|-----|-----|-----|-----|
| 6262271 | 69* | 71  | 49* | 53* |
| 6262273 | 82  | 87  | 73  | 75  |
| 6262274 | 81  | 75  | 73  | 75  |
| 6262276 | 86  | 90  | 69* | 70  |
| 6262277 | 77  | 72  | 66* | 72  |
| 6262279 | 65* | 55* | 42* | 33* |
| 6262280 | 74  | 75  | 56* | 66* |
| 6262282 | 81  | 80  | 63* | 60* |
| 6262283 | 84  | 85  | 75  | 82  |
| 6262295 | 90  | 90  | 72  | 74  |
| Blank   | 90  | 94  | 83  | 80  |
| LCS     | 89  | 92  | 80  | 78  |
| LCSD    | 92  | 93  | 82  | 84  |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3) by 8260 (soil)

Batch number: Q111161AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |      |     |     |
|---------|-----|------|-----|-----|
| 6262287 | 105 | 106  | 83  | 85  |
| 6262294 | 74  | 76   | 56* | 52* |
| Blank   | 92  | 96   | 78  | 76  |
| LCS     | 106 | 110* | 88  | 85  |
| LCSD    | 103 | 106  | 87  | 84  |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3) by 8260 (soil)

Batch number: Q111162AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |     |    |    |
|---------|-----|-----|----|----|
| 6262285 | 94  | 96  | 83 | 93 |
| Blank   | 94  | 96  | 77 | 75 |
| LCS     | 109 | 108 | 89 | 85 |
| LCSD    | 107 | 106 | 88 | 85 |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3) by 8260 (soil)

Batch number: X111131AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |      |     |     |
|---------|-----|------|-----|-----|
| 6262260 | 98  | 109  | 92  | 96  |
| 6262269 | 108 | 113* | 107 | 73  |
| 6262272 | 100 | 110* | 97  | 87  |
| 6262275 | 104 | 106  | 99  | 80  |
| 6262281 | 106 | 108  | 92  | 95  |
| 6262284 | 109 | 113* | 115 | 65* |
| 6262286 | 105 | 110* | 95  | 85  |
| 6262289 | 99  | 104  | 101 | 89  |
| 6262290 | 106 | 112* | 110 | 85  |
| 6262292 | 99  | 105  | 91  | 96  |
| 6262293 | 110 | 110* | 120 | 79  |
| 6262296 | 106 | 110* | 105 | 105 |
| Blank   | 106 | 108  | 91  | 96  |
| LCS     | 105 | 107  | 101 | 97  |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Surrogate Quality Control

| LCSD                                 | 106                  | 107                   | 101        | 98                   |
|--------------------------------------|----------------------|-----------------------|------------|----------------------|
| Limits:                              | 71-114               | 70-109                | 70-123     | 70-111               |
| Analysis Name: TCL(4.3)by 8260(soil) |                      |                       |            |                      |
| Batch number: X111151AA              |                      |                       |            |                      |
|                                      | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
| 6262263                              | 100                  | 104                   | 93         | 102                  |
| 6262265                              | 101                  | 100                   | 102        | 103                  |
| 6262278                              | 102                  | 107                   | 95         | 96                   |
| 6262288                              | 97                   | 103                   | 91         | 99                   |
| 6262291                              | 100                  | 105                   | 93         | 95                   |
| Blank                                | 103                  | 106                   | 94         | 100                  |
| LCS                                  | 105                  | 106                   | 102        | 100                  |
| LCSD                                 | 104                  | 100                   | 103        | 100                  |
| Limits:                              | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: TCL 8270 (microwave)  
Batch number: 11110SLA026

|         | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6262260 | 104       | 109            | 85                   | 102             | 91               | 90            |
| 6262261 | 37*       | 42             | 36                   | 64              | 46*              | 47            |
| 6262262 | 96        | 98             | 84                   | 110             | 104              | 89            |
| 6262263 | 84        | 87             | 76                   | 96              | 90               | 82            |
| 6262264 | 78        | 83             | 77                   | 112             | 86               | 83            |
| 6262265 | 81        | 40             | 30                   | 96              | 94               | 82            |
| 6262266 | 92        | 97             | 79                   | 102             | 97               | 78            |
| 6262267 | 99        | 83             | 57                   | 219*            | 109              | 92            |
| 6262268 | 89        | 90             | 85                   | 99              | 94               | 85            |
| 6262269 | 81        | 85             | 76                   | 88              | 82               | 78            |
| Blank   | 90        | 95             | 91                   | 95              | 91               | 78            |
| LCS     | 102       | 107            | 95                   | 105             | 98               | 91            |
| MS      | 101       | 106            | 86                   | 101             | 94               | 89            |
| MSD     | 103       | 106            | 88                   | 102             | 95               | 93            |
| Limits: | 42-130    | 39-136         | 28-139               | 55-121          | 56-121           | 43-124        |

Analysis Name: TCL 8270 (microwave)  
Batch number: 11110SLD026

|         | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6262270 | 72        | 69             | 65                   | 128*            | 84               | 82            |
| 6262271 | 80        | 73             | 72                   | 106             | 85               | 68            |
| 6262272 | 83        | 81             | 81                   | 84              | 87               | 75            |
| 6262273 | 68        | 67             | 46                   | 77              | 66               | 58            |
| 6262274 | 78        | 78             | 77                   | 83              | 80               | 69            |
| 6262275 | 78        | 78             | 73                   | 76              | 83               | 72            |
| 6262276 | 95        | 83             | 53                   | 102             | 96               | 86            |
| 6262277 | 73        | 73             | 70                   | 74              | 77               | 64            |
| 6262278 | 75        | 74             | 65                   | 67              | 70               | 58            |
| 6262279 | 47        | 47             | 43                   | 50*             | 48*              | 44            |
| 6262280 | 95        | 97             | 85                   | 157*            | 112              | 97            |
| 6262281 | 94        | 94             | 91                   | 91              | 95               | 80            |
| 6262282 | 86        | 83             | 81                   | 111             | 84               | 76            |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 05/05/11 at 02:47 PM

Group Number: 1242848

### Surrogate Quality Control

|         |     |     |    |     |     |     |
|---------|-----|-----|----|-----|-----|-----|
| 6262283 | 80  | 81  | 90 | 105 | 88  | 72  |
| 6262284 | 74  | 77  | 72 | 80  | 76  | 77  |
| 6262285 | 73  | 72  | 76 | 116 | 78  | 69  |
| 6262286 | 64  | 65  | 74 | 63  | 66  | 58  |
| 6262287 | 35* | 36* | 45 | 41* | 42* | 36* |
| 6262288 | 79  | 82  | 77 | 82  | 86  | 70  |
| 6262289 | 85  | 86  | 82 | 87  | 90  | 43  |
| Blank   | 103 | 101 | 95 | 93  | 94  | 83  |
| LCS     | 103 | 103 | 98 | 92  | 94  | 88  |
| MS      | 42  | 36* | 33 | 89  | 42* | 48  |
| MSD     | 55  | 53  | 39 | 81  | 58  | 56  |

|         |        |        |        |        |        |        |
|---------|--------|--------|--------|--------|--------|--------|
| Limits: | 42-130 | 39-136 | 28-139 | 55-121 | 56-121 | 43-124 |
|---------|--------|--------|--------|--------|--------|--------|

Analysis Name: TCL 8270 (microwave)

Batch number: 11111SLA026

|         | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6262290 | 59        | 32*            | 35                   | 70              | 64               | 59            |
| 6262291 | 71        | 73             | 55                   | 74              | 70               | 65            |
| 6262292 | 73        | 75             | 59                   | 74              | 73               | 65            |
| 6262293 | 58        | 57             | 48                   | 60              | 59               | 52            |
| 6262294 | 58        | 58             | 50                   | 63              | 59               | 53            |
| 6262295 | 109       | 101            | 90                   | 240*            | 123*             | 107           |
| 6262296 | 86        | 88             | 75                   | 85              | 82               | 78            |
| Blank   | 96        | 98             | 100                  | 99              | 96               | 97            |
| LCS     | 99        | 100            | 93                   | 97              | 94               | 92            |
| MS      | 59        | 36*            | 37                   | 60              | 51*              | 46            |
| MSD     | 65        | 41             | 38                   | 74              | 69               | 62            |

|         |        |        |        |        |        |        |
|---------|--------|--------|--------|--------|--------|--------|
| Limits: | 42-130 | 39-136 | 28-139 | 55-121 | 56-121 | 43-124 |
|---------|--------|--------|--------|--------|--------|--------|

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1242848 Sample # 6262260-96 **COC #** 259438

Please print. Instructions on reverse side correspond with circled numbers. 0.8-2.1<sup>cc</sup>

|                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                          |  |                                                                                                                                                          |  |                                                      |  |       |  |       |  |   |  |                                                                |  |                |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------|--|-------|--|-------|--|---|--|----------------------------------------------------------------|--|----------------|--|--|--|--|--|--|--|--|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHKA REF AOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u> |  |  |  | <b>Matrix</b><br>Check if Applicable<br><input type="checkbox"/> Potable <input type="checkbox"/> NPDES<br><input type="checkbox"/> Water <input type="checkbox"/> Other |  | <b>5 Analyses Requested</b><br><b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |  |                                                      |  |       |  |       |  |   |  | <b>6</b><br>Temperature of samples upon receipt (if requested) |  |                |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                      |  |  |  |                                                                                                                                                                          |  | FSC: _____<br>SCR#: _____                                                                                                                                |  |                                                      |  |       |  |       |  |   |  |                                                                |  |                |  |  |  |  |  |  |  |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                       |  |  |  | <b>3</b> Composite                                                                                                                                                       |  | <b>4</b> Total # of Containers                                                                                                                           |  | TOL VOCs 82400<br>TOL SVOCs 82200<br>TAL Metals 6020 |  |       |  |       |  |   |  |                                                                |  | <b>Remarks</b> |  |  |  |  |  |  |  |  |
| Date Collected                                                                                                                                                                                                                                                       |  |  |  | Time Collected                                                                                                                                                           |  | Grab                                                                                                                                                     |  | Soil                                                 |  | Water |  | Other |  |   |  |                                                                |  |                |  |  |  |  |  |  |  |  |
| BH-10-69-WC - 0-2'                                                                                                                                                                                                                                                   |  |  |  | 4/12/11                                                                                                                                                                  |  | 815                                                                                                                                                      |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-69-WC - 5-8'                                                                                                                                                                                                                                                   |  |  |  |                                                                                                                                                                          |  | 830                                                                                                                                                      |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-69-WC - 15.5-16'                                                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                          |  | 900                                                                                                                                                      |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-46-WC - 0-2'                                                                                                                                                                                                                                                   |  |  |  |                                                                                                                                                                          |  | 915                                                                                                                                                      |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-46-WC - 5-8'                                                                                                                                                                                                                                                   |  |  |  |                                                                                                                                                                          |  | 930                                                                                                                                                      |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-46-WC - 17-18'                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                          |  | 1000                                                                                                                                                     |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-44-WC - 0-2'                                                                                                                                                                                                                                                   |  |  |  |                                                                                                                                                                          |  | 1020                                                                                                                                                     |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-44-WC - 10-12'                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                          |  | 1040                                                                                                                                                     |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |
| BH-10-44-WC - 24-26'                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                          |  | 1100                                                                                                                                                     |  | X                                                    |  | X     |  |       |  | 4 |  | X X X                                                          |  |                |  |  |  |  |  |  |  |  |

|                                                                                                                                                                                                                                                                                                                         |  |  |  |                                                                          |  |                                                                        |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------|--|------------------------------------------------------------------------|--|
| <b>7</b> Turnaround Time Requested (TAT) (please circle): <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax <u>E-mail</u><br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/12/11</u> Time <u>0600</u> |  | Received by: <u>Sample Fridge</u> Date <u>4/15/11</u> Time <u>0600</u> |  |
|                                                                                                                                                                                                                                                                                                                         |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/14/11</u> Time <u>0925</u> |  | Received by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>0925</u>   |  |
|                                                                                                                                                                                                                                                                                                                         |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>1450</u> |  | Received by: _____ Date _____ Time _____                               |  |
|                                                                                                                                                                                                                                                                                                                         |  |  |  | Relinquished by: _____ Date _____ Time _____                             |  | Received by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>1450</u>   |  |

|                                                                                                                          |  |                                                                                                                                                                                   |  |                             |  |
|--------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|--|
| <b>8</b> Data Package Options (please circle if required)                                                                |  |                                                                                                                                                                                   |  | SDG Complete? <u>Yes</u> No |  |
| Type I (validation/NJ Reg)<br>Type II (Tier II)<br>Type III (Reduced NJ)<br>Type IV (CLP SOW)<br>Type VI (Raw Data Only) |  | TX TRRP-13<br>MA MCP CT RCP<br>Site-specific QC (MS/MSD/Dup)? Yes <u>No</u><br>(If yes, indicate QC sample and submit triplicate volume.)<br>Internal COC Required? Yes <u>No</u> |  |                             |  |

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1242848 Sample # 6262260-96 **COC #** 260329

Please print. Instructions on reverse side correspond with circled numbers. 0.8-2.1<sup>cc</sup>

|                                                                                                                                                                                                                                                                       |                |                |  |                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |  |  |  |  |  |  |                                               |                |                |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|--|-----------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|-----------------------------------------------|----------------|----------------|--|--|--|--|--|--|--|--|--|---|---|---|--|--|--|--|--|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF ADI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u> |                |                |  | <b>4</b> Matrix<br>Check if Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Applicable<br>Water _____ Other _____ |  | <b>5</b> Analyses Requested<br><b>Preservation Codes</b>                                                                                                                                                                                                                                                                                                             |  |  |  |  |  |  |  |  |  | For Lab Use Only<br>FSC: _____<br>SCR#: _____ |                |                |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |  |  |
|                                                                                                                                                                                                                                                                       |                |                |  |                                                                                                                                   |  | <table border="1" style="width: 100%; text-align: center;"> <tr> <td>TOL VOLs 82603</td> <td>TOL SVOLs 8270</td> <td>TOL metals 602</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> |  |  |  |  |  |  |  |  |  | TOL VOLs 82603                                | TOL SVOLs 8270 | TOL metals 602 |  |  |  |  |  |  |  |  |  | X | X | X |  |  |  |  |  |
| TOL VOLs 82603                                                                                                                                                                                                                                                        | TOL SVOLs 8270 | TOL metals 602 |  |                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |  |  |  |  |  |  |                                               |                |                |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |  |  |
| X                                                                                                                                                                                                                                                                     | X              | X              |  |                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |  |  |  |  |  |  |                                               |                |                |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |  |  |

| 2 Sample Identification |  | Date Collected | Time Collected | 3 Grab | Composite | Soil | Water | Other | 4 Total # of Containers | 5 Analyses Requested |                |                |  |  |  |  |  |  |  | 6 Remarks | Temperature of samples upon receipt (if requested) |
|-------------------------|--|----------------|----------------|--------|-----------|------|-------|-------|-------------------------|----------------------|----------------|----------------|--|--|--|--|--|--|--|-----------|----------------------------------------------------|
|                         |  |                |                |        |           |      |       |       |                         | TOL VOLs 82603       | TOL SVOLs 8270 | TOL metals 602 |  |  |  |  |  |  |  |           |                                                    |
| BH-10-45-WC - 0-2'      |  | 4/12/11        | 1215           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-45-WC - 5-8'      |  |                | 1230           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-45-WC - 18-20'    |  |                | 1300           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-55-WC - 0-2'      |  |                | 1430           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-55-WC - 5-8'      |  |                | 1445           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-55-WC - 20-22'    |  |                | 1500           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-56-WC - 0-2'      |  |                | 1600           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-56-WC - 10-12'    |  |                | 1630           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |
| BH-10-56-WC - 22-24'    |  |                | 1700           | X      |           | X    |       |       | 4                       | X                    | X              | X              |  |  |  |  |  |  |  |           |                                                    |

|                                                                                                                                                                                                                                                                                                                         |  |  |  |                                                                          |  |                                                                      |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------|--|----------------------------------------------------------------------|--|
| <b>7</b> Turnaround Time Requested (TAT) (please circle): <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax <u>E-mail</u><br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>0600</u> |  | Received by: <u>Sample Frig</u> Date <u>4/19/11</u> Time <u>0600</u> |  |
| Relinquished by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>0925</u>                                                                                                                                                                                                                                                |  |  |  | Received by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>0925</u>     |  |                                                                      |  |
| Relinquished by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>1450</u>                                                                                                                                                                                                                                                |  |  |  | Received by: _____ Date _____ Time _____                                 |  |                                                                      |  |
| Relinquished by: _____ Date _____ Time _____                                                                                                                                                                                                                                                                            |  |  |  | Received by: _____ Date _____ Time _____                                 |  |                                                                      |  |
| Relinquished by: _____ Date _____ Time _____                                                                                                                                                                                                                                                                            |  |  |  | Received by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>1450</u>     |  |                                                                      |  |

|                                                           |                                                            |  |                             |  |
|-----------------------------------------------------------|------------------------------------------------------------|--|-----------------------------|--|
| <b>8</b> Data Package Options (please circle if required) |                                                            |  | SDG Complete? <u>Yes</u> No |  |
| Type I (validation/NJ Reg)                                | TX TRRP-13                                                 |  |                             |  |
| Type II (Tier II)                                         | MA MCP CT RCP                                              |  |                             |  |
| Type III (Reduced NJ)                                     | Site-specific QC (MS/MSD/Dup)? Yes <u>No</u>               |  |                             |  |
| Type IV (CLP SOW)                                         | (If yes, indicate QC sample and submit triplicate volume.) |  |                             |  |
| Type VI (Raw Data Only)                                   | Internal COC Required? Yes / <u>No</u>                     |  |                             |  |

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1242848 Sample # 6262260-96 **COC #** 260330

Please print. Instructions on reverse side correspond with circled numbers. 0.8-2.1<sup>°C</sup>

|                                                                                                                                                                                                                                                                                                                                                             |  |                |                |                                                                                                                                          |      |                                                                                                                    |       |                       |                |                 |                 |         |  |  |  |                                                             |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------|-------|-----------------------|----------------|-----------------|-----------------|---------|--|--|--|-------------------------------------------------------------|--|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF ADI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                                                                       |  |                |                | <b>4</b> Matrix<br>Check if Applicable<br><input type="checkbox"/> Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Other |      | <b>5</b> Analyses Requested<br><b>Preservation Codes</b>                                                           |       |                       |                |                 |                 |         |  |  |  | For Lab Use Only<br>FSC: _____<br>SCR#: _____               |  |
|                                                                                                                                                                                                                                                                                                                                                             |  |                |                |                                                                                                                                          |      | Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |       |                       |                |                 |                 |         |  |  |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                                                                              |  | Date Collected | Time Collected | <b>3</b> Grab Composite                                                                                                                  | Soil | Water                                                                                                              | Other | Total # of Containers | TCL VOCs 8260b | TCL SVOCs 8270c | TAL metals 6020 | Remarks |  |  |  |                                                             |  |
| BH-10-77-WC-0-2'                                                                                                                                                                                                                                                                                                                                            |  | 4/13/11        | 1000           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-77-WC-10-12'                                                                                                                                                                                                                                                                                                                                          |  |                | 1030           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-77-WC-20-22'                                                                                                                                                                                                                                                                                                                                          |  |                | 1100           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-63-WC-0-2'                                                                                                                                                                                                                                                                                                                                            |  |                | 1415           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-63-WC-12-14'                                                                                                                                                                                                                                                                                                                                          |  |                | 1430           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-63-WC-21-23'                                                                                                                                                                                                                                                                                                                                          |  |                | 1500           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-64-WC-0-2'                                                                                                                                                                                                                                                                                                                                            |  |                | 1520           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-64-WC-11-13'                                                                                                                                                                                                                                                                                                                                          |  |                | 1540           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-64-WC-24-26'                                                                                                                                                                                                                                                                                                                                          |  |                | 1600           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| BH-10-77-WC-6.5-7'                                                                                                                                                                                                                                                                                                                                          |  |                | 1045           | X                                                                                                                                        | X    |                                                                                                                    |       | 4                     | X              | X               | X               |         |  |  |  |                                                             |  |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax <u>E-mail</u><br>Phone #: _____ Fax #: _____<br>E-mail address: _____                                     |  |                |                | Relinquished by: <u>[Signature]</u> / AGT<br>Date: <u>4/15/11</u> Time: <u>0600</u>                                                      |      | Received by: <u>Sample Frige</u><br>Date: <u>4/15/11</u> Time: <u>0600</u>                                         |       | <b>9</b>              |                |                 |                 |         |  |  |  |                                                             |  |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes <u>No</u><br>Type IV (CLP SOW) (If yes, indicate QC sample and submit triplicate volume.)<br>Type VI (Raw Data Only) Internal COC Required? Yes <u>No</u> |  |                |                | Relinquished by: <u>[Signature]</u><br>Date: <u>4/19/11</u> Time: <u>0925</u>                                                            |      | Received by: <u>[Signature]</u> / Sykes<br>Date: <u>4/19/11</u> Time: <u>0925</u>                                  |       |                       |                |                 |                 |         |  |  |  |                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                             |  |                |                | Relinquished by: <u>[Signature]</u><br>Date: <u>4/19/11</u> Time: <u>1450</u>                                                            |      | Received by: <u>[Signature]</u><br>Date: <u>4/19/11</u> Time: <u>1450</u>                                          |       |                       |                |                 |                 |         |  |  |  |                                                             |  |

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1242848 Sample # 6262260-96 **COC #** 259435

Please print. Instructions on reverse side correspond with circled numbers. 0.8-2.1°C

|                                                                                                                                                                                                                                                                                                                         |  |  |  |                                                                                                                                                                                                     |                |                                                                                                                                                          |      |                                                                          |       |                                                                |         |                                                                          |   |                                              |  |                                                             |  |                                          |  |  |                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------|-------|----------------------------------------------------------------|---------|--------------------------------------------------------------------------|---|----------------------------------------------|--|-------------------------------------------------------------|--|------------------------------------------|--|--|----------------------------------------------------|
| <b>1</b> Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF AOT-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. STOKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                                  |  |  |  | <b>Matrix</b><br>Check if Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Applicable<br>Soil <input type="checkbox"/> Water <input type="checkbox"/> Other <input type="checkbox"/> |                | <b>5 Analyses Requested</b><br><b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |      |                                                                          |       |                                                                |         |                                                                          |   |                                              |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |                                          |  |  |                                                    |
|                                                                                                                                                                                                                                                                                                                         |  |  |  |                                                                                                                                                                                                     |                | <b>4 Total # of Containers</b><br>TOL VOCs 8260s<br>TOL SVOCs 8260s<br>TAL Metals 6010                                                                   |      |                                                                          |       |                                                                |         |                                                                          |   |                                              |  |                                                             |  |                                          |  |  |                                                    |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                                          |  |  |  | Date Collected                                                                                                                                                                                      | Time Collected | <b>3</b> Grab Composite                                                                                                                                  | Soil | Water                                                                    | Other | Total # of Containers                                          | Remarks |                                                                          |   |                                              |  |                                                             |  |                                          |  |  | Temperature of samples upon receipt (if requested) |
| BH-10-43-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  | 4/14/11                                                                                                                                                                                             | 900            | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-48-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 945            | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-51-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1020           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-52-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1115           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-68-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1330           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-65-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1415           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-58-0-2'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1520           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-65-6-8'                                                                                                                                                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                     | 1430           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| BH-10-65-14-16'                                                                                                                                                                                                                                                                                                         |  |  |  |                                                                                                                                                                                                     | 1500           | X                                                                                                                                                        | X    |                                                                          |       | 4                                                              | X       | X                                                                        | X |                                              |  |                                                             |  |                                          |  |  |                                                    |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax <u>E-mail</u><br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |  |  | Relinquished by: <u>[Signature]</u> Date <u>4/15/11</u> Time <u>0600</u>                                                                                                                            |                | Received by: <u>Sample Fridge</u> Date <u>4/15/11</u> Time <u>0600</u>                                                                                   |      | Relinquished by: <u>[Signature]</u> Date <u>4/14/11</u> Time <u>0925</u> |       | Received by: <u>Ryden</u> Date <u>4/19/11</u> Time <u>0925</u> |         | Relinquished by: <u>[Signature]</u> Date <u>4/19/11</u> Time <u>1450</u> |   | Received by: _____ Date _____ Time _____     |  | Relinquished by: _____ Date _____ Time _____                |  | Received by: _____ Date _____ Time _____ |  |  |                                                    |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes <u>No</u><br>Type IV (CLP SOW) Internal COC Required? Yes <u>No</u><br>Type VI (Raw Data Only)                        |  |  |  | SDG Complete? <u>Yes</u> No                                                                                                                                                                         |                | Relinquished by: _____ Date _____ Time _____                                                                                                             |      | Received by: <u>[Signature]</u> Date <u>4/17/11</u> Time <u>1450</u>     |       | Relinquished by: _____ Date _____ Time _____                   |         | Received by: _____ Date _____ Time _____                                 |   | Relinquished by: _____ Date _____ Time _____ |  | Received by: _____ Date _____ Time _____                    |  |                                          |  |  |                                                    |

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions, and Lancaster hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 21, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/12/2011  
Group Number: 1241810  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionBH-10-70-WC@0'-2' Grab Soil  
BH-10-70-WC@5'-8' Grab Soil  
BH-10-70-WC@15.5-16' Grab SoilLancaster Labs (LLI) #6256388  
6256389  
6256390

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC      Langan

Attn: Dennis Webster

COPY TO

ELECTRONIC      SUN: Aquaterra Tech.

Attn: Tiffani Doerr

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ELECTRONIC      LLI

Attn: EDD Group

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ELECTRONIC      Langan

Attn: Kristen Ward

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ELECTRONIC      Aquaterra Tech

Attn: Loretta Belfiglio

COPY TO

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Chad A. Moline  
Group Leader

**Sample Description:** BH-10-70-WC@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@0'-2'

LLI Sample # SW 6256388  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 15:00 by TD

SUN: Aquaterra Tech.

Submitted: 04/12/2011 17:00

PO Box 744

Reported: 04/21/2011 17:55

West Chester PA 19381

B7010

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | 57           | 19                         | 7                          | 0.81            |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.81            |
| 10950        | Bromodichloromethane        | 75-27-4             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Bromoform                   | 75-25-2             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Bromomethane                | 74-83-9             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | 2-Butanone                  | 78-93-3             | < 9          | 9                          | 4                          | 0.81            |
| 10950        | Carbon Disulfide            | 75-15-0             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Chlorobenzene               | 108-90-7            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Chloroethane                | 75-00-3             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Chloroform                  | 67-66-3             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Chloromethane               | 74-87-3             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Cyclohexane                 | 110-82-7            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Dibromochloromethane        | 124-48-1            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Freon 113                   | 76-13-1             | < 9          | 9                          | 2                          | 0.81            |
| 10950        | 2-Hexanone                  | 591-78-6            | < 9          | 9                          | 3                          | 0.81            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Methyl Acetate              | 79-20-9             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.81            |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 9          | 9                          | 3                          | 0.81            |
| 10950        | Methylcyclohexane           | 108-87-2            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Methylene Chloride          | 75-09-2             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Styrene                     | 100-42-5            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Tetrachloroethene           | 127-18-4            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Trichloroethene             | 79-01-6             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 5          | 5                          | 2                          | 0.81            |
| 10950        | Vinyl Chloride              | 75-01-4             | < 5          | 5                          | 0.9                        | 0.81            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 0.9                        | 0.81            |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@0'-2'

LLI Sample # SW 6256388  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 15:00 by TD

SUN: Aquaterra Tech.

Submitted: 04/12/2011 17:00

PO Box 744

Reported: 04/21/2011 17:55

West Chester PA 19381

B7010

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | < 190        | 190                        | 39                         | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | < 190        | 190                        | 39                         | 1               |
| 10727        | Acetophenone                 | 98-86-2             | < 190        | 190                        | 77                         | 1               |
| 10727        | Anthracene                   | 120-12-7            | < 190        | 190                        | 39                         | 1               |
| 10727        | Atrazine                     | 1912-24-9           | < 190        | 190                        | 39                         | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | < 190        | 190                        | 77                         | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | < 190        | 190                        | 39                         | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | < 190        | 190                        | 39                         | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | < 190        | 190                        | 39                         | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | < 190        | 190                        | 39                         | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | < 190        | 190                        | 39                         | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 190        | 190                        | 39                         | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 190        | 190                        | 39                         | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 190        | 190                        | 77                         | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 190        | 190                        | 77                         | 1               |
| 10727        | Caprolactam                  | 105-60-2            | < 190        | 190                        | 39                         | 1               |
| 10727        | Carbazole                    | 86-74-8             | < 190        | 190                        | 39                         | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 190        | 190                        | 77                         | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 190        | 190                        | 77                         | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 190        | 190                        | 39                         | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 190        | 190                        | 39                         | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 190        | 190                        | 39                         | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 190        | 190                        | 39                         | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 190        | 190                        | 39                         | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 190        | 190                        | 39                         | 1               |
| 10727        | Chrysene                     | 218-01-9            | < 190        | 190                        | 39                         | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | < 190        | 190                        | 39                         | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | < 190        | 190                        | 39                         | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 390        | 390                        | 120                        | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 190        | 190                        | 39                         | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | < 190        | 190                        | 77                         | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 190        | 190                        | 77                         | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | < 190        | 190                        | 77                         | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 580        | 580                        | 190                        | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 1,200      | 1,200                      | 390                        | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 190        | 190                        | 77                         | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 190        | 190                        | 39                         | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | < 390        | 390                        | 77                         | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | < 190        | 190                        | 39                         | 1               |
| 10727        | Fluorene                     | 86-73-7             | < 190        | 190                        | 39                         | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 190        | 190                        | 39                         | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 190        | 190                        | 77                         | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 580        | 580                        | 190                        | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | < 190        | 190                        | 39                         | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | < 190        | 190                        | 39                         | 1               |
| 10727        | Isophorone                   | 78-59-1             | < 190        | 190                        | 39                         | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | < 190        | 190                        | 39                         | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | < 190        | 190                        | 77                         | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | < 190        | 190                        | 77                         | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@0'-2'

**LLI Sample #** SW 6256388  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 15:00 by TD

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/12/2011 17:00

Reported: 04/21/2011 17:55

B7010

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 190        | 190                        | 39                         | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 190        | 190                        | 39                         | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 190        | 190                        | 77                         | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 190        | 190                        | 77                         | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 190        | 190                        | 39                         | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 190        | 190                        | 39                         | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 580        | 580                        | 190                        | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 190        | 190                        | 39                         | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 190        | 190                        | 39                         | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 190        | 190                        | 77                         | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 580        | 580                        | 190                        | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | < 190        | 190                        | 39                         | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 190        | 190                        | 39                         | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | < 190        | 190                        | 39                         | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 190        | 190                        | 77                         | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 190        | 190                        | 39                         | 1               |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 102,000      | 117                        | 29.3                       | 5               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 11.7       | 11.7                       | 5.83                       | 5               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | < 11.7       | 11.7                       | 5.54                       | 5               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 154          | 0.583                      | 0.0466                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | 2.06         | 0.583                      | 0.0793                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | < 2.91       | 2.91                       | 0.816                      | 5               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 988          | 23.3                       | 7.14                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | 298          | 8.74                       | 3.44                       | 5               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | 46.6         | 2.91                       | 1.11                       | 5               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 88.9         | 5.83                       | 1.28                       | 5               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 69,100       | 117                        | 27.4                       | 5               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 20.8         | 8.74                       | 3.50                       | 5               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 2,100        | 11.7                       | 2.96                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 798          | 0.583                      | 0.0909                     | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | 132          | 5.83                       | 1.11                       | 5               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | 1,010        | 291                        | 105                        | 5               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 11.7       | 11.7                       | 5.71                       | 5               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 2.91       | 2.91                       | 1.05                       | 5               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | 147          | 117                        | 43.5                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 17.5       | 17.5                       | 8.45                       | 5               |
|               | Reporting limits for ICP metals were raised due to interference from the sample matrix.                                                                                                                     |                     |              |                            |                            |                 |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | 141          | 2.91                       | 1.11                       | 5               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | 66.4         | 11.7                       | 3.85                       | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-70-WC@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@0'-2'

**LLI Sample #** SW 6256388  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/11/2011 15:00 by TD

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/12/2011 17:00

West Chester PA 19381

**Reported:** 04/21/2011 17:55

B7010

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                  |                            |                            |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>< 0.116 | mg/kg<br>0.116             | mg/kg<br>0.0033            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                  |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>14.2        | %<br>0.50                  | %<br>0.50                  | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                  |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111061AA    | 04/16/2011 15:35       | Chelsea B Eastep    | 0.81            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201110324087 | 04/11/2011 15:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201110324087 | 04/11/2011 15:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201110324087 | 04/11/2011 15:00       | Client Supplied     | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11104SLA026  | 04/16/2011 05:15       | Linda M Hartenstine | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11104SLA026  | 04/14/2011 14:10       | Wanda F Oswald      | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111035708001 | 04/15/2011 09:02       | Joanne M Gates      | 5               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder       | 5               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:17       | Tara L Snyder       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@0'-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@0'-2'

**LLI Sample #** SW 6256388  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/11/2011 15:00 by TD

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/12/2011 17:00

West Chester PA 19381

**Reported:** 04/21/2011 17:55

B7010

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder        | 5               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder        | 5               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 08:29       | Tara L Snyder        | 5               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111035711001 | 04/14/2011 08:34       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111035708001 | 04/13/2011 20:09       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111035711001 | 04/13/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11103820005B | 04/13/2011 18:27       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-70-WC@5'-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@5'-8'

LLI Sample # SW 6256389  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:00 by TD

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/12/2011 17:00

Reported: 04/21/2011 17:55

B7012

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | 88           | 55                         | 19                         | 1.9             |
| 10950        | Benzene                     | 71-43-2             | 24           | 14                         | 1                          | 1.9             |
| 10950        | Bromodichloromethane        | 75-27-4             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Bromoform                   | 75-25-2             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Bromomethane                | 74-83-9             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | 2-Butanone                  | 78-93-3             | 27           | 27                         | 11                         | 1.9             |
| 10950        | Carbon Disulfide            | 75-15-0             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Chlorobenzene               | 108-90-7            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Chloroethane                | 75-00-3             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Chloroform                  | 67-66-3             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Chloromethane               | 74-87-3             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Cyclohexane                 | 110-82-7            | 62           | 14                         | 3                          | 1.9             |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Dibromochloromethane        | 124-48-1            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 14         | 14                         | 3                          | 1.9             |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Ethylbenzene                | 100-41-4            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Freon 113                   | 76-13-1             | < 27         | 27                         | 5                          | 1.9             |
| 10950        | 2-Hexanone                  | 591-78-6            | < 27         | 27                         | 8                          | 1.9             |
| 10950        | Isopropylbenzene            | 98-82-8             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Methyl Acetate              | 79-20-9             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 14         | 14                         | 1                          | 1.9             |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 27         | 27                         | 8                          | 1.9             |
| 10950        | Methylcyclohexane           | 108-87-2            | 79           | 14                         | 3                          | 1.9             |
| 10950        | Methylene Chloride          | 75-09-2             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Styrene                     | 100-42-5            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Tetrachloroethene           | 127-18-4            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Toluene                     | 108-88-3            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Trichloroethene             | 79-01-6             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 14         | 14                         | 5                          | 1.9             |
| 10950        | Vinyl Chloride              | 75-01-4             | < 14         | 14                         | 3                          | 1.9             |
| 10950        | Xylene (Total)              | 1330-20-7           | 17           | 14                         | 3                          | 1.9             |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@5'-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@5'-8'

LLI Sample # SW 6256389  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:00 by TD

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/12/2011 17:00

Reported: 04/21/2011 17:55

B7012

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Acenaphthylene               | 208-96-8            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Acetophenone                 | 98-86-2             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Anthracene                   | 120-12-7            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Atrazine                     | 1912-24-9           | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Benzaldehyde                 | 100-52-7            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Benzo(a)anthracene           | 56-55-3             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Benzo(a)pyrene               | 50-32-8             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Caprolactam                  | 105-60-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Carbazole                    | 86-74-8             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Chrysene                     | 218-01-9            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Dibenzofuran                 | 132-64-9            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 29,000     | 29,000                     | 8,700                      | 1               |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Diethylphthalate             | 84-66-2             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Dimethylphthalate            | 131-11-3            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 43,000     | 43,000                     | 14,000                     | 1               |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 87,000     | 87,000                     | 29,000                     | 1               |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | < 29,000     | 29,000                     | 5,800                      | 1               |
| 10727        | Fluoranthene                 | 206-44-0            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Fluorene                     | 86-73-7             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 43,000     | 43,000                     | 14,000                     | 1               |
| 10727        | Hexachloroethane             | 67-72-1             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | Isophorone                   | 78-59-1             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727        | 2-Methylphenol               | 95-48-7             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727        | 4-Methylphenol               | 106-44-5            | < 14,000     | 14,000                     | 5,800                      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@5'-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@5'-8'

LLI Sample # SW 6256389  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:00 by TD

SUN: Aquaterra Tech.

Submitted: 04/12/2011 17:00

PO Box 744

Reported: 04/21/2011 17:55

West Chester PA 19381

B7012

| CAT No.       | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>  | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|               | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727         | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727         | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727         | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 43,000     | 43,000                     | 14,000                     | 1               |
| 10727         | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 14,000     | 14,000                     | 2,900                      | 1               |
|               | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727         | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727         | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 43,000     | 43,000                     | 14,000                     | 1               |
| 10727         | Phenanthrene                                                                                                                                                                                                | 85-01-8             | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | Phenol                                                                                                                                                                                                      | 108-95-2            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | Pyrene                                                                                                                                                                                                      | 129-00-0            | < 14,000     | 14,000                     | 2,900                      | 1               |
| 10727         | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 14,000     | 14,000                     | 5,800                      | 1               |
| 10727         | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 14,000     | 14,000                     | 2,900                      | 1               |
|               | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                            |                            |                 |
| <b>Metals</b> | <b>SW-846 6010B</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643         | Aluminum                                                                                                                                                                                                    | 7429-90-5           | 153          | 28.6                       | 7.19                       | 1               |
| 06944         | Antimony                                                                                                                                                                                                    | 7440-36-0           | < 2.86       | 2.86                       | 1.43                       | 1               |
| 06935         | Arsenic                                                                                                                                                                                                     | 7440-38-2           | < 2.86       | 2.86                       | 1.36                       | 1               |
| 06946         | Barium                                                                                                                                                                                                      | 7440-39-3           | 25.3         | 0.714                      | 0.0571                     | 1               |
| 06947         | Beryllium                                                                                                                                                                                                   | 7440-41-7           | < 0.714      | 0.714                      | 0.0972                     | 1               |
| 06949         | Cadmium                                                                                                                                                                                                     | 7440-43-9           | < 0.714      | 0.714                      | 0.200                      | 1               |
| 01650         | Calcium                                                                                                                                                                                                     | 7440-70-2           | 115          | 28.6                       | 8.76                       | 1               |
| 06951         | Chromium                                                                                                                                                                                                    | 7440-47-3           | < 2.14       | 2.14                       | 0.843                      | 1               |
| 06952         | Cobalt                                                                                                                                                                                                      | 7440-48-4           | < 0.714      | 0.714                      | 0.271                      | 1               |
| 06953         | Copper                                                                                                                                                                                                      | 7440-50-8           | 1.46         | 1.43                       | 0.314                      | 1               |
| 01654         | Iron                                                                                                                                                                                                        | 7439-89-6           | 219          | 28.6                       | 6.73                       | 1               |
| 06955         | Lead                                                                                                                                                                                                        | 7439-92-1           | 7.74         | 2.14                       | 0.857                      | 1               |
| 01657         | Magnesium                                                                                                                                                                                                   | 7439-95-4           | 56.8         | 14.3                       | 3.63                       | 1               |
| 06958         | Manganese                                                                                                                                                                                                   | 7439-96-5           | 2.23         | 0.714                      | 0.111                      | 1               |
| 06961         | Nickel                                                                                                                                                                                                      | 7440-02-0           | < 1.43       | 1.43                       | 0.271                      | 1               |
| 01662         | Potassium                                                                                                                                                                                                   | 7440-09-7           | < 71.4       | 71.4                       | 25.7                       | 1               |
| 06936         | Selenium                                                                                                                                                                                                    | 7782-49-2           | < 2.86       | 2.86                       | 1.40                       | 1               |
| 06966         | Silver                                                                                                                                                                                                      | 7440-22-4           | < 0.714      | 0.714                      | 0.257                      | 1               |
| 01667         | Sodium                                                                                                                                                                                                      | 7440-23-5           | < 143        | 143                        | 53.3                       | 1               |
| 06925         | Thallium                                                                                                                                                                                                    | 7440-28-0           | < 4.29       | 4.29                       | 2.07                       | 1               |
| 06971         | Vanadium                                                                                                                                                                                                    | 7440-62-2           | < 0.714      | 0.714                      | 0.271                      | 1               |
| 06972         | Zinc                                                                                                                                                                                                        | 7440-66-6           | < 2.86       | 2.86                       | 0.943                      | 1               |
|               | <b>SW-846 7471A</b>                                                                                                                                                                                         |                     | <b>mg/kg</b> | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-70-WC@5'-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@5'-8'

**LLI Sample #** SW 6256389  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/11/2011 16:00 by TD

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/12/2011 17:00

West Chester PA 19381

**Reported:** 04/21/2011 17:55

B7012

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                  |                            |                            |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>< 0.136 | mg/kg<br>0.136             | mg/kg<br>0.0039            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                  |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>30.7        | %<br>0.50                  | %<br>0.50                  | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                  |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | X111061AA    | 04/16/2011 14:05       | Chelsea B Eastep    | 1.9             |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201110324087 | 04/11/2011 16:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201110324087 | 04/11/2011 16:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201110324087 | 04/11/2011 16:00       | Client Supplied     | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11104SLA026  | 04/16/2011 06:28       | Linda M Hartenstine | 1               |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11104SLA026  | 04/14/2011 14:10       | Wanda F Oswald      | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111035708001 | 04/15/2011 07:54       | Joanne M Gates      | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111035708001 | 04/15/2011 07:54       | Joanne M Gates      | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@5'-8' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@5'-8'

**LLI Sample #** SW 6256389  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/11/2011 16:00 by TD

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/12/2011 17:00

West Chester PA 19381

**Reported:** 04/21/2011 17:55

B7012

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder        | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder        | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:21       | Tara L Snyder        | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111035711001 | 04/14/2011 08:35       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111035708001 | 04/13/2011 20:09       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111035711001 | 04/13/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11103820005B | 04/13/2011 18:27       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-70-WC@15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@15.5-

LLI Sample # SW 6256390  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:20 by TD

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/12/2011 17:00

Reported: 04/21/2011 17:55

B7013

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Acetone                     | 67-64-1             | < 1,400      | 1,400                      | 480                        | 55.51           |
| 10950        | Benzene                     | 71-43-2             | 350          | 340                        | 34                         | 55.51           |
| 10950        | Bromodichloromethane        | 75-27-4             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Bromoform                   | 75-25-2             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Bromomethane                | 74-83-9             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | 2-Butanone                  | 78-93-3             | < 690        | 690                        | 270                        | 55.51           |
| 10950        | Carbon Disulfide            | 75-15-0             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Carbon Tetrachloride        | 56-23-5             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Chlorobenzene               | 108-90-7            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Chloroethane                | 75-00-3             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Chloroform                  | 67-66-3             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Chloromethane               | 74-87-3             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Cyclohexane                 | 110-82-7            | 2,100        | 340                        | 69                         | 55.51           |
| 10950        | 1,2-Dibromo-3-chloropropane | 96-12-8             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Dibromochloromethane        | 124-48-1            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Dichlorodifluoromethane     | 75-71-8             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | 1,1-Dichloroethane          | 75-34-3             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,1-Dichloroethene          | 75-35-4             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | cis-1,2-Dichloroethene      | 156-59-2            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | trans-1,2-Dichloroethene    | 156-60-5            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,2-Dichloropropane         | 78-87-5             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | cis-1,3-Dichloropropene     | 10061-01-5          | < 340        | 340                        | 69                         | 55.51           |
| 10950        | trans-1,3-Dichloropropene   | 10061-02-6          | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Ethylbenzene                | 100-41-4            | 780          | 340                        | 69                         | 55.51           |
| 10950        | Freon 113                   | 76-13-1             | < 690        | 690                        | 140                        | 55.51           |
| 10950        | 2-Hexanone                  | 591-78-6            | < 690        | 690                        | 210                        | 55.51           |
| 10950        | Isopropylbenzene            | 98-82-8             | 440          | 340                        | 69                         | 55.51           |
| 10950        | Methyl Acetate              | 79-20-9             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 340        | 340                        | 34                         | 55.51           |
| 10950        | 4-Methyl-2-pentanone        | 108-10-1            | < 690        | 690                        | 210                        | 55.51           |
| 10950        | Methylcyclohexane           | 108-87-2            | 5,800        | 340                        | 69                         | 55.51           |
| 10950        | Methylene Chloride          | 75-09-2             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Styrene                     | 100-42-5            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,1,2,2-Tetrachloroethane   | 79-34-5             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Tetrachloroethene           | 127-18-4            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Toluene                     | 108-88-3            | 390          | 340                        | 69                         | 55.51           |
| 10950        | 1,2,4-Trichlorobenzene      | 120-82-1            | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,1,1-Trichloroethane       | 71-55-6             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | 1,1,2-Trichloroethane       | 79-00-5             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Trichloroethene             | 79-01-6             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Trichlorofluoromethane      | 75-69-4             | < 340        | 340                        | 140                        | 55.51           |
| 10950        | Vinyl Chloride              | 75-01-4             | < 340        | 340                        | 69                         | 55.51           |
| 10950        | Xylene (Total)              | 1330-20-7           | 3,800        | 340                        | 69                         | 55.51           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@15.5-

LLI Sample # SW 6256390  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:20 by TD

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/12/2011 17:00

Reported: 04/21/2011 17:55

B7013

| CAT No.      | Analysis Name                | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>         | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10727        | Acenaphthene                 | 83-32-9             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Acenaphthylene               | 208-96-8            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Acetophenone                 | 98-86-2             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Anthracene                   | 120-12-7            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Atrazine                     | 1912-24-9           | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Benzaldehyde                 | 100-52-7            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Benzo(a)anthracene           | 56-55-3             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Benzo(a)pyrene               | 50-32-8             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Benzo(b)fluoranthene         | 205-99-2            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Benzo(g,h,i)perylene         | 191-24-2            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Benzo(k)fluoranthene         | 207-08-9            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 1,1'-Biphenyl                | 92-52-4             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 4-Bromophenyl-phenylether    | 101-55-3            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Butylbenzylphthalate         | 85-68-7             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Di-n-butylphthalate          | 84-74-2             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Caprolactam                  | 105-60-2            | 3,600        | 2,100                      | 410                        | 10              |
| 10727        | Carbazole                    | 86-74-8             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 4-Chloro-3-methylphenol      | 59-50-7             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 4-Chloroaniline              | 106-47-8            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | bis(2-Chloroethoxy)methane   | 111-91-1            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | bis(2-Chloroethyl)ether      | 111-44-4            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2-Chloronaphthalene          | 91-58-7             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2-Chlorophenol               | 95-57-8             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 4-Chlorophenyl-phenylether   | 7005-72-3           | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2,2'-oxybis(1-Chloropropane) | 108-60-1            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Chrysene                     | 218-01-9            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Dibenz(a,h)anthracene        | 53-70-3             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Dibenzofuran                 | 132-64-9            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 3,3'-Dichlorobenzidine       | 91-94-1             | < 4,100      | 4,100                      | 1,200                      | 10              |
| 10727        | 2,4-Dichlorophenol           | 120-83-2            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Diethylphthalate             | 84-66-2             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 2,4-Dimethylphenol           | 105-67-9            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Dimethylphthalate            | 131-11-3            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 4,6-Dinitro-2-methylphenol   | 534-52-1            | < 6,200      | 6,200                      | 2,100                      | 10              |
| 10727        | 2,4-Dinitrophenol            | 51-28-5             | < 12,000     | 12,000                     | 4,100                      | 10              |
| 10727        | 2,4-Dinitrotoluene           | 121-14-2            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 2,6-Dinitrotoluene           | 606-20-2            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | bis(2-Ethylhexyl)phthalate   | 117-81-7            | < 4,100      | 4,100                      | 820                        | 10              |
| 10727        | Fluoranthene                 | 206-44-0            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Fluorene                     | 86-73-7             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Hexachlorobenzene            | 118-74-1            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Hexachlorobutadiene          | 87-68-3             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Hexachlorocyclopentadiene    | 77-47-4             | < 6,200      | 6,200                      | 2,100                      | 10              |
| 10727        | Hexachloroethane             | 67-72-1             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Indeno(1,2,3-cd)pyrene       | 193-39-5            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Isophorone                   | 78-59-1             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2-Methylnaphthalene          | 91-57-6             | 4,900        | 2,100                      | 410                        | 10              |
| 10727        | 2-Methylphenol               | 95-48-7             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 4-Methylphenol               | 106-44-5            | < 2,100      | 2,100                      | 820                        | 10              |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@15.5-

LLI Sample # SW 6256390  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:20 by TD

SUN: Aquaterra Tech.

Submitted: 04/12/2011 17:00

PO Box 744

Reported: 04/21/2011 17:55

West Chester PA 19381

B7013

| CAT No.      | Analysis Name                                                                                                                                                                                               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Semivolatiles</b>                                                                                                                                                                                        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
|              | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. |                     |              |                            |                            |                 |
| 10727        | Naphthalene                                                                                                                                                                                                 | 91-20-3             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2-Nitroaniline                                                                                                                                                                                              | 88-74-4             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 3-Nitroaniline                                                                                                                                                                                              | 99-09-2             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 4-Nitroaniline                                                                                                                                                                                              | 100-01-6            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Nitrobenzene                                                                                                                                                                                                | 98-95-3             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2-Nitrophenol                                                                                                                                                                                               | 88-75-5             | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 4-Nitrophenol                                                                                                                                                                                               | 100-02-7            | < 6,200      | 6,200                      | 2,100                      | 10              |
| 10727        | N-Nitroso-di-n-propylamine                                                                                                                                                                                  | 621-64-7            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | N-Nitrosodiphenylamine                                                                                                                                                                                      | 86-30-6             | < 2,100      | 2,100                      | 410                        | 10              |
|              | N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.                                    |                     |              |                            |                            |                 |
| 10727        | Di-n-octylphthalate                                                                                                                                                                                         | 117-84-0            | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | Pentachlorophenol                                                                                                                                                                                           | 87-86-5             | < 6,200      | 6,200                      | 2,100                      | 10              |
| 10727        | Phenanthrene                                                                                                                                                                                                | 85-01-8             | 2,100        | 2,100                      | 410                        | 10              |
| 10727        | Phenol                                                                                                                                                                                                      | 108-95-2            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | Pyrene                                                                                                                                                                                                      | 129-00-0            | < 2,100      | 2,100                      | 410                        | 10              |
| 10727        | 2,4,5-Trichlorophenol                                                                                                                                                                                       | 95-95-4             | < 2,100      | 2,100                      | 820                        | 10              |
| 10727        | 2,4,6-Trichlorophenol                                                                                                                                                                                       | 88-06-2             | < 2,100      | 2,100                      | 410                        | 10              |
|              | Reporting limits were raised due to interference from the sample matrix.                                                                                                                                    |                     |              |                            |                            |                 |

## Metals

**SW-846 6010B**

|       |           |           | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
|-------|-----------|-----------|--------------|--------------|--------------|---|
| 01643 | Aluminum  | 7429-90-5 | 12,800       | 24.7         | 6.22         | 1 |
| 06944 | Antimony  | 7440-36-0 | < 2.47       | 2.47         | 1.24         | 1 |
| 06935 | Arsenic   | 7440-38-2 | 3.96         | 2.47         | 1.17         | 1 |
| 06946 | Barium    | 7440-39-3 | 74.9         | 0.618        | 0.0494       | 1 |
| 06947 | Beryllium | 7440-41-7 | < 0.618      | 0.618        | 0.0841       | 1 |
| 06949 | Cadmium   | 7440-43-9 | 0.876        | 0.618        | 0.173        | 1 |
| 01650 | Calcium   | 7440-70-2 | 2,120        | 24.7         | 7.58         | 1 |
| 06951 | Chromium  | 7440-47-3 | 27.3         | 1.85         | 0.729        | 1 |
| 06952 | Cobalt    | 7440-48-4 | 6.88         | 0.618        | 0.235        | 1 |
| 06953 | Copper    | 7440-50-8 | 10.8         | 1.24         | 0.272        | 1 |
| 01654 | Iron      | 7439-89-6 | 19,600       | 24.7         | 5.82         | 1 |
| 06955 | Lead      | 7439-92-1 | 40.9         | 1.85         | 0.742        | 1 |
| 01657 | Magnesium | 7439-95-4 | 3,870        | 12.4         | 3.14         | 1 |
| 06958 | Manganese | 7439-96-5 | 405          | 0.618        | 0.0964       | 1 |
| 06961 | Nickel    | 7440-02-0 | 16.0         | 1.24         | 0.235        | 1 |
| 01662 | Potassium | 7440-09-7 | 2,020        | 61.8         | 22.2         | 1 |
| 06936 | Selenium  | 7782-49-2 | < 2.47       | 2.47         | 1.21         | 1 |
| 06966 | Silver    | 7440-22-4 | < 0.618      | 0.618        | 0.222        | 1 |
| 01667 | Sodium    | 7440-23-5 | 1,150        | 124          | 46.1         | 1 |
| 06925 | Thallium  | 7440-28-0 | < 3.71       | 3.71         | 1.79         | 1 |
| 06971 | Vanadium  | 7440-62-2 | 28.7         | 0.618        | 0.235        | 1 |
| 06972 | Zinc      | 7440-66-6 | 44.8         | 2.47         | 0.816        | 1 |

**SW-846 7471A**

**mg/kg**

**mg/kg**

**mg/kg**

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-70-WC@15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@15.5-

**LLI Sample #** SW 6256390  
**LLI Group #** 1241810  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:20 by TD

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/12/2011 17:00

West Chester PA 19381

Reported: 04/21/2011 17:55

B7013

| CAT No.                                                                                                                                                               | Analysis Name | CAS Number                | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Metals</b>                                                                                                                                                         |               |                           |                  |                            |                            |                 |
| 00159                                                                                                                                                                 | Mercury       | SW-846 7471A<br>7439-97-6 | mg/kg<br>< 0.120 | mg/kg<br>0.120             | mg/kg<br>0.0034            | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                  |               |                           |                  |                            |                            |                 |
| 00111                                                                                                                                                                 | Moisture      | SM20 2540 G<br>n.a.       | %<br>19.1        | %<br>0.50                  | %<br>0.50                  | 1               |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |               |                           |                  |                            |                            |                 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | TCL(4.3)by 8260(soil)          | SW-846 8260B | 1      | Q111051AA    | 04/15/2011 14:45       | Nicholas R Rossi    | 55.51           |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201110324087 | 04/11/2011 16:20       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201110324087 | 04/11/2011 16:20       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201110324087 | 04/11/2011 16:20       | Client Supplied     | 1               |
| 10727   | TCL 8270 (microwave)           | SW-846 8270C | 1      | 11104SLA026  | 04/16/2011 06:52       | Linda M Hartenstine | 10              |
| 10809   | BNA Soil Microwave             | SW-846 3546  | 1      | 11104SLA026  | 04/14/2011 14:10       | Wanda F Oswald      | 1               |
| 01643   | Aluminum                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06944   | Antimony                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06935   | Arsenic                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06946   | Barium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06947   | Beryllium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06949   | Cadmium                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 01650   | Calcium                        | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06951   | Chromium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06952   | Cobalt                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06953   | Copper                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 01654   | Iron                           | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06955   | Lead                           | SW-846 6010B | 1      | 111035708001 | 04/15/2011 07:57       | Joanne M Gates      | 1               |
| 01657   | Magnesium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06958   | Manganese                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06961   | Nickel                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 01662   | Potassium                      | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06936   | Selenium                       | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 06966   | Silver                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |
| 01667   | Sodium                         | SW-846 6010B | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-70-WC@15.5-16' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 260713 BH-10-70-WC@15.5-

LLI Sample # SW 6256390  
LLI Group # 1241810  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/11/2011 16:20 by TD

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/12/2011 17:00

West Chester PA 19381

Reported: 04/21/2011 17:55

B7013

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name       | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|---------------------|-----------------------|--------|--------------|------------------------|----------------------|-----------------|
| 06925   | Thallium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder        | 1               |
| 06971   | Vanadium            | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder        | 1               |
| 06972   | Zinc                | SW-846 6010B          | 1      | 111035708001 | 04/14/2011 07:25       | Tara L Snyder        | 1               |
| 00159   | Mercury             | SW-846 7471A          | 1      | 111035711001 | 04/14/2011 08:36       | Damary Valentin      | 1               |
| 05708   | SW SW846 ICP Digest | SW-846 3050B          | 1      | 111035708001 | 04/13/2011 20:09       | Annamaria Stipkovits | 1               |
| 05711   | SW SW846 Hg Digest  | SW-846 7471A modified | 1      | 111035711001 | 04/13/2011 23:40       | Annamaria Stipkovits | 1               |
| 00111   | Moisture            | SM20 2540 G           | 1      | 11103820005B | 04/13/2011 18:27       | Scott W Freisher     | 1               |

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                     | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: Q111051AA Sample number(s): 6256390 |              |             |           |              |          |           |                 |     |         |
| Acetone                                           | < 1,000      | 1,000.      | 350       | ug/kg        | 121      | 128       | 32-209          | 6   | 30      |
| Benzene                                           | < 250        | 250.        | 25        | ug/kg        | 99       | 102       | 80-120          | 2   | 30      |
| Bromodichloromethane                              | < 250        | 250.        | 50        | ug/kg        | 94       | 96        | 78-120          | 2   | 30      |
| Bromoform                                         | < 250        | 250.        | 50        | ug/kg        | 84       | 89        | 70-120          | 6   | 30      |
| Bromomethane                                      | < 250        | 250.        | 100       | ug/kg        | 106      | 91        | 32-162          | 15  | 30      |
| 2-Butanone                                        | < 500        | 500.        | 200       | ug/kg        | 101      | 109       | 46-153          | 8   | 30      |
| Carbon Disulfide                                  | < 250        | 250.        | 50        | ug/kg        | 98       | 101       | 67-122          | 3   | 30      |
| Carbon Tetrachloride                              | < 250        | 250.        | 50        | ug/kg        | 92       | 94        | 69-122          | 3   | 30      |
| Chlorobenzene                                     | < 250        | 250.        | 50        | ug/kg        | 93       | 96        | 80-120          | 2   | 30      |
| Chloroethane                                      | < 250        | 250.        | 100       | ug/kg        | 107      | 91        | 37-154          | 16  | 30      |
| Chloroform                                        | < 250        | 250.        | 50        | ug/kg        | 95       | 98        | 80-120          | 3   | 30      |
| Chloromethane                                     | < 250        | 250.        | 100       | ug/kg        | 86       | 84        | 54-132          | 3   | 30      |
| Cyclohexane                                       | < 250        | 250.        | 50        | ug/kg        | 88       | 89        | 62-121          | 1   | 30      |
| 1,2-Dibromo-3-chloropropane                       | < 250        | 250.        | 100       | ug/kg        | 71       | 78        | 58-120          | 9   | 30      |
| Dibromochloromethane                              | < 250        | 250.        | 50        | ug/kg        | 91       | 95        | 77-120          | 4   | 30      |
| 1,2-Dibromoethane                                 | < 250        | 250.        | 50        | ug/kg        | 93       | 98        | 80-120          | 5   | 30      |
| 1,2-Dichlorobenzene                               | < 250        | 250.        | 50        | ug/kg        | 88       | 90        | 79-120          | 2   | 30      |
| 1,3-Dichlorobenzene                               | < 250        | 250.        | 50        | ug/kg        | 90       | 92        | 78-120          | 2   | 30      |
| 1,4-Dichlorobenzene                               | < 250        | 250.        | 50        | ug/kg        | 89       | 92        | 79-120          | 3   | 30      |
| Dichlorodifluoromethane                           | < 250        | 250.        | 100       | ug/kg        | 56       | 52        | 20-120          | 7   | 30      |
| 1,1-Dichloroethane                                | < 250        | 250.        | 50        | ug/kg        | 98       | 100       | 80-120          | 2   | 30      |
| 1,2-Dichloroethane                                | < 250        | 250.        | 50        | ug/kg        | 95       | 97        | 71-129          | 3   | 30      |
| 1,1-Dichloroethene                                | < 250        | 250.        | 50        | ug/kg        | 100      | 105       | 73-123          | 4   | 30      |
| cis-1,2-Dichloroethene                            | < 250        | 250.        | 50        | ug/kg        | 97       | 101       | 80-120          | 4   | 30      |
| trans-1,2-Dichloroethene                          | < 250        | 250.        | 50        | ug/kg        | 100      | 101       | 79-120          | 1   | 30      |
| 1,2-Dichloropropane                               | < 250        | 250.        | 50        | ug/kg        | 97       | 99        | 80-120          | 3   | 30      |
| cis-1,3-Dichloropropene                           | < 250        | 250.        | 50        | ug/kg        | 95       | 99        | 80-120          | 4   | 30      |
| trans-1,3-Dichloropropene                         | < 250        | 250.        | 50        | ug/kg        | 89       | 94        | 77-120          | 6   | 30      |
| Ethylbenzene                                      | < 250        | 250.        | 50        | ug/kg        | 93       | 96        | 80-120          | 3   | 30      |
| Freon 113                                         | < 500        | 500.        | 100       | ug/kg        | 90       | 89        | 61-126          | 1   | 30      |
| 2-Hexanone                                        | < 500        | 500.        | 150       | ug/kg        | 76       | 83        | 45-155          | 9   | 30      |
| Isopropylbenzene                                  | < 250        | 250.        | 50        | ug/kg        | 94       | 97        | 76-120          | 3   | 30      |
| Methyl Acetate                                    | < 250        | 250.        | 100       | ug/kg        | 101      | 105       | 61-152          | 4   | 30      |
| Methyl Tertiary Butyl Ether                       | < 250        | 250.        | 25        | ug/kg        | 88       | 95        | 74-121          | 8   | 30      |
| 4-Methyl-2-pentanone                              | < 500        | 500.        | 150       | ug/kg        | 87       | 96        | 61-134          | 9   | 30      |
| Methylcyclohexane                                 | < 250        | 250.        | 50        | ug/kg        | 101      | 103       | 57-138          | 2   | 30      |
| Methylene Chloride                                | < 250        | 250.        | 100       | ug/kg        | 99       | 101       | 76-124          | 2   | 30      |
| Styrene                                           | < 250        | 250.        | 50        | ug/kg        | 94       | 97        | 76-120          | 3   | 30      |
| 1,1,2,2-Tetrachloroethane                         | < 250        | 250.        | 50        | ug/kg        | 84       | 89        | 71-123          | 6   | 30      |
| Tetrachloroethene                                 | < 250        | 250.        | 50        | ug/kg        | 92       | 95        | 77-120          | 4   | 30      |
| Toluene                                           | < 250        | 250.        | 50        | ug/kg        | 95       | 98        | 80-120          | 3   | 30      |
| 1,2,4-Trichlorobenzene                            | < 250        | 250.        | 50        | ug/kg        | 70       | 78        | 68-120          | 11  | 30      |
| 1,1,1-Trichloroethane                             | < 250        | 250.        | 50        | ug/kg        | 95       | 99        | 71-125          | 4   | 30      |
| 1,1,2-Trichloroethane                             | < 250        | 250.        | 50        | ug/kg        | 91       | 94        | 80-120          | 3   | 30      |
| Trichloroethene                                   | < 250        | 250.        | 50        | ug/kg        | 98       | 101       | 80-120          | 3   | 30      |
| Trichlorofluoromethane                            | < 250        | 250.        | 100       | ug/kg        | 84       | 83        | 58-133          | 1   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

| Analysis Name  | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|----------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Vinyl Chloride | < 250        | 250.        | 50        | ug/kg        | 85       | 85        | 53-120          | 0   | 30      |
| Xylene (Total) | < 250        | 250.        | 50        | ug/kg        | 95       | 97        | 80-120          | 3   | 30      |

|                             |                                   |     |     |       |     |  |        |  |  |
|-----------------------------|-----------------------------------|-----|-----|-------|-----|--|--------|--|--|
| Batch number: X111061AA     | Sample number(s): 6256388-6256389 |     |     |       |     |  |        |  |  |
| Acetone                     | < 20                              | 20. | 7   | ug/kg | 125 |  | 32-209 |  |  |
| Benzene                     | < 5                               | 5.  | 0.5 | ug/kg | 97  |  | 80-120 |  |  |
| Bromodichloromethane        | < 5                               | 5.  | 1   | ug/kg | 90  |  | 78-120 |  |  |
| Bromoform                   | < 5                               | 5.  | 1   | ug/kg | 89  |  | 70-120 |  |  |
| Bromomethane                | < 5                               | 5.  | 2   | ug/kg | 83  |  | 32-162 |  |  |
| 2-Butanone                  | < 10                              | 10. | 4   | ug/kg | 121 |  | 46-153 |  |  |
| Carbon Disulfide            | < 5                               | 5.  | 1   | ug/kg | 81  |  | 67-122 |  |  |
| Carbon Tetrachloride        | < 5                               | 5.  | 1   | ug/kg | 90  |  | 69-122 |  |  |
| Chlorobenzene               | < 5                               | 5.  | 1   | ug/kg | 93  |  | 80-120 |  |  |
| Chloroethane                | < 5                               | 5.  | 2   | ug/kg | 84  |  | 37-154 |  |  |
| Chloroform                  | < 5                               | 5.  | 1   | ug/kg | 95  |  | 80-120 |  |  |
| Chloromethane               | < 5                               | 5.  | 2   | ug/kg | 86  |  | 54-132 |  |  |
| Cyclohexane                 | < 5                               | 5.  | 1   | ug/kg | 89  |  | 62-121 |  |  |
| 1,2-Dibromo-3-chloropropane | < 5                               | 5.  | 2   | ug/kg | 113 |  | 58-120 |  |  |
| Dibromochloromethane        | < 5                               | 5.  | 1   | ug/kg | 92  |  | 77-120 |  |  |
| 1,2-Dibromoethane           | < 5                               | 5.  | 1   | ug/kg | 101 |  | 80-120 |  |  |
| 1,2-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 97  |  | 79-120 |  |  |
| 1,3-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 94  |  | 78-120 |  |  |
| 1,4-Dichlorobenzene         | < 5                               | 5.  | 1   | ug/kg | 97  |  | 79-120 |  |  |
| Dichlorodifluoromethane     | < 5                               | 5.  | 2   | ug/kg | 75  |  | 20-120 |  |  |
| 1,1-Dichloroethane          | < 5                               | 5.  | 1   | ug/kg | 95  |  | 80-120 |  |  |
| 1,2-Dichloroethane          | < 5                               | 5.  | 1   | ug/kg | 100 |  | 71-129 |  |  |
| 1,1-Dichloroethene          | < 5                               | 5.  | 1   | ug/kg | 93  |  | 73-123 |  |  |
| cis-1,2-Dichloroethene      | < 5                               | 5.  | 1   | ug/kg | 94  |  | 80-120 |  |  |
| trans-1,2-Dichloroethene    | < 5                               | 5.  | 1   | ug/kg | 95  |  | 79-120 |  |  |
| 1,2-Dichloropropane         | < 5                               | 5.  | 1   | ug/kg | 95  |  | 80-120 |  |  |
| cis-1,3-Dichloropropene     | < 5                               | 5.  | 1   | ug/kg | 91  |  | 80-120 |  |  |
| trans-1,3-Dichloropropene   | < 5                               | 5.  | 1   | ug/kg | 90  |  | 77-120 |  |  |
| Ethylbenzene                | < 5                               | 5.  | 1   | ug/kg | 97  |  | 80-120 |  |  |
| Freon 113                   | < 10                              | 10. | 2   | ug/kg | 89  |  | 61-126 |  |  |
| 2-Hexanone                  | < 10                              | 10. | 3   | ug/kg | 121 |  | 45-155 |  |  |
| Isopropylbenzene            | < 5                               | 5.  | 1   | ug/kg | 97  |  | 76-120 |  |  |
| Methyl Acetate              | < 5                               | 5.  | 2   | ug/kg | 122 |  | 61-152 |  |  |
| Methyl Tertiary Butyl Ether | < 5                               | 5.  | 0.5 | ug/kg | 95  |  | 74-121 |  |  |
| 4-Methyl-2-pentanone        | < 10                              | 10. | 3   | ug/kg | 118 |  | 61-134 |  |  |
| Methylcyclohexane           | < 5                               | 5.  | 1   | ug/kg | 93  |  | 57-138 |  |  |
| Methylene Chloride          | < 5                               | 5.  | 2   | ug/kg | 93  |  | 76-124 |  |  |
| Styrene                     | < 5                               | 5.  | 1   | ug/kg | 92  |  | 76-120 |  |  |
| 1,1,2,2-Tetrachloroethane   | < 5                               | 5.  | 1   | ug/kg | 106 |  | 71-123 |  |  |
| Tetrachloroethene           | < 5                               | 5.  | 1   | ug/kg | 95  |  | 77-120 |  |  |
| Toluene                     | < 5                               | 5.  | 1   | ug/kg | 96  |  | 80-120 |  |  |
| 1,2,4-Trichlorobenzene      | < 5                               | 5.  | 1   | ug/kg | 90  |  | 68-120 |  |  |
| 1,1,1-Trichloroethane       | < 5                               | 5.  | 1   | ug/kg | 92  |  | 71-125 |  |  |
| 1,1,2-Trichloroethane       | < 5                               | 5.  | 1   | ug/kg | 97  |  | 80-120 |  |  |
| Trichloroethene             | < 5                               | 5.  | 1   | ug/kg | 95  |  | 80-120 |  |  |
| Trichlorofluoromethane      | < 5                               | 5.  | 2   | ug/kg | 88  |  | 58-133 |  |  |
| Vinyl Chloride              | < 5                               | 5.  | 1   | ug/kg | 89  |  | 53-120 |  |  |
| Xylene (Total)              | < 5                               | 5.  | 1   | ug/kg | 97  |  | 80-120 |  |  |

|                           |                                   |      |    |       |     |  |        |  |  |
|---------------------------|-----------------------------------|------|----|-------|-----|--|--------|--|--|
| Batch number: 11104SLA026 | Sample number(s): 6256388-6256390 |      |    |       |     |  |        |  |  |
| Acenaphthene              | < 170                             | 170. | 33 | ug/kg | 98  |  | 83-111 |  |  |
| Acenaphthylene            | < 170                             | 170. | 33 | ug/kg | 101 |  | 68-120 |  |  |
| Acetophenone              | < 170                             | 170. | 67 | ug/kg | 88  |  | 70-106 |  |  |
| Anthracene                | < 170                             | 170. | 33 | ug/kg | 100 |  | 83-111 |  |  |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

| <u>Analysis Name</u>         | <u>Blank Result</u> | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|------------------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Atrazine                     | < 170               | 170.               | 33               | ug/kg               | 105             |                  | 69-122                 |            |                |
| Benzaldehyde                 | < 170               | 170.               | 67               | ug/kg               | 33              |                  | 10-74                  |            |                |
| Benzo(a)anthracene           | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 82-111                 |            |                |
| Benzo(a)pyrene               | < 170               | 170.               | 33               | ug/kg               | 102             |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene         | < 170               | 170.               | 33               | ug/kg               | 101             |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene         | < 170               | 170.               | 33               | ug/kg               | 96              |                  | 63-130                 |            |                |
| Benzo(k)fluoranthene         | < 170               | 170.               | 33               | ug/kg               | 105             |                  | 71-135                 |            |                |
| 1,1'-Biphenyl                | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 82-106                 |            |                |
| 4-Bromophenyl-phenylether    | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 79-117                 |            |                |
| Butylbenzylphthalate         | < 170               | 170.               | 67               | ug/kg               | 97              |                  | 83-122                 |            |                |
| Di-n-butylphthalate          | < 170               | 170.               | 67               | ug/kg               | 99              |                  | 79-112                 |            |                |
| Caprolactam                  | < 170               | 170.               | 33               | ug/kg               | 83              |                  | 65-113                 |            |                |
| Carbazole                    | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 83-111                 |            |                |
| 4-Chloro-3-methylphenol      | < 170               | 170.               | 67               | ug/kg               | 91              |                  | 74-119                 |            |                |
| 4-Chloroaniline              | < 170               | 170.               | 67               | ug/kg               | 36              |                  | 10-97                  |            |                |
| bis(2-Chloroethoxy)methane   | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 82-113                 |            |                |
| bis(2-Chloroethyl)ether      | < 170               | 170.               | 33               | ug/kg               | 95              |                  | 77-115                 |            |                |
| 2-Chloronaphthalene          | < 170               | 170.               | 33               | ug/kg               | 102             |                  | 59-139                 |            |                |
| 2-Chlorophenol               | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 83-119                 |            |                |
| 4-Chlorophenyl-phenylether   | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 79-110                 |            |                |
| 2,2'-oxybis(1-Chloropropane) | < 170               | 170.               | 33               | ug/kg               | 87              |                  | 67-130                 |            |                |
| Chrysene                     | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 81-111                 |            |                |
| Dibenz(a,h)anthracene        | < 170               | 170.               | 33               | ug/kg               | 95              |                  | 67-129                 |            |                |
| Dibenzofuran                 | < 170               | 170.               | 33               | ug/kg               | 98              |                  | 85-110                 |            |                |
| 3,3'-Dichlorobenzidine       | < 330               | 330.               | 100              | ug/kg               | 40              |                  | 35-94                  |            |                |
| 2,4-Dichlorophenol           | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 87-117                 |            |                |
| Diethylphthalate             | < 170               | 170.               | 67               | ug/kg               | 95              |                  | 82-113                 |            |                |
| 2,4-Dimethylphenol           | < 170               | 170.               | 67               | ug/kg               | 97              |                  | 83-120                 |            |                |
| Dimethylphthalate            | < 170               | 170.               | 67               | ug/kg               | 97              |                  | 85-111                 |            |                |
| 4,6-Dinitro-2-methylphenol   | < 500               | 500.               | 170              | ug/kg               | 89              |                  | 60-113                 |            |                |
| 2,4-Dinitrophenol            | < 1,000             | 1,000.             | 330              | ug/kg               | 84              |                  | 51-124                 |            |                |
| 2,4-Dinitrotoluene           | < 170               | 170.               | 67               | ug/kg               | 96              |                  | 80-116                 |            |                |
| 2,6-Dinitrotoluene           | < 170               | 170.               | 33               | ug/kg               | 96              |                  | 79-115                 |            |                |
| bis(2-Ethylhexyl)phthalate   | < 330               | 330.               | 67               | ug/kg               | 99              |                  | 80-119                 |            |                |
| Fluoranthene                 | < 170               | 170.               | 33               | ug/kg               | 102             |                  | 80-113                 |            |                |
| Fluorene                     | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 81-117                 |            |                |
| Hexachlorobenzene            | < 170               | 170.               | 33               | ug/kg               | 101             |                  | 79-115                 |            |                |
| Hexachlorobutadiene          | < 170               | 170.               | 67               | ug/kg               | 97              |                  | 70-112                 |            |                |
| Hexachlorocyclopentadiene    | < 500               | 500.               | 170              | ug/kg               | 104             |                  | 64-127                 |            |                |
| Hexachloroethane             | < 170               | 170.               | 33               | ug/kg               | 88              |                  | 76-109                 |            |                |
| Indeno(1,2,3-cd)pyrene       | < 170               | 170.               | 33               | ug/kg               | 93              |                  | 64-128                 |            |                |
| Isophorone                   | < 170               | 170.               | 33               | ug/kg               | 92              |                  | 72-107                 |            |                |
| 2-Methylnaphthalene          | < 170               | 170.               | 33               | ug/kg               | 90              |                  | 79-110                 |            |                |
| 2-Methylphenol               | < 170               | 170.               | 67               | ug/kg               | 91              |                  | 80-119                 |            |                |
| 4-Methylphenol               | < 170               | 170.               | 67               | ug/kg               | 97              |                  | 74-116                 |            |                |
| Naphthalene                  | < 170               | 170.               | 33               | ug/kg               | 94              |                  | 83-112                 |            |                |
| 2-Nitroaniline               | < 170               | 170.               | 33               | ug/kg               | 96              |                  | 83-118                 |            |                |
| 3-Nitroaniline               | < 170               | 170.               | 67               | ug/kg               | 86              |                  | 66-114                 |            |                |
| 4-Nitroaniline               | < 170               | 170.               | 67               | ug/kg               | 69              |                  | 52-92                  |            |                |
| Nitrobenzene                 | < 170               | 170.               | 33               | ug/kg               | 97              |                  | 78-122                 |            |                |
| 2-Nitrophenol                | < 170               | 170.               | 33               | ug/kg               | 94              |                  | 81-114                 |            |                |
| 4-Nitrophenol                | < 500               | 500.               | 170              | ug/kg               | 85              |                  | 57-131                 |            |                |
| N-Nitroso-di-n-propylamine   | < 170               | 170.               | 33               | ug/kg               | 86              |                  | 70-113                 |            |                |
| N-Nitrosodiphenylamine       | < 170               | 170.               | 33               | ug/kg               | 105             |                  | 86-112                 |            |                |
| Di-n-octylphthalate          | < 170               | 170.               | 67               | ug/kg               | 100             |                  | 65-141                 |            |                |
| Pentachlorophenol            | < 500               | 500.               | 170              | ug/kg               | 83              |                  | 50-133                 |            |                |
| Phenanthrene                 | < 170               | 170.               | 33               | ug/kg               | 100             |                  | 83-109                 |            |                |
| Phenol                       | < 170               | 170.               | 33               | ug/kg               | 92              |                  | 74-115                 |            |                |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

| <u>Analysis Name</u>  | <u>Blank Result</u> | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-----------------------|---------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Pyrene                | < 170               | 170.               | 33               | ug/kg               | 102             |                  | 80-121                 |            |                |
| 2,4,5-Trichlorophenol | < 170               | 170.               | 67               | ug/kg               | 99              |                  | 84-109                 |            |                |
| 2,4,6-Trichlorophenol | < 170               | 170.               | 33               | ug/kg               | 99              |                  | 88-114                 |            |                |

|                            |                                   |       |        |       |     |  |        |  |  |
|----------------------------|-----------------------------------|-------|--------|-------|-----|--|--------|--|--|
| Batch number: 111035708001 | Sample number(s): 6256388-6256390 |       |        |       |     |  |        |  |  |
| Aluminum                   | < 20.0                            | 20.0  | 5.03   | mg/kg | 95  |  | 61-110 |  |  |
| Antimony                   | < 2.00                            | 2.00  | 1.00   | mg/kg | 124 |  | 38-150 |  |  |
| Arsenic                    | < 2.00                            | 2.00  | 0.950  | mg/kg | 98  |  | 90-110 |  |  |
| Barium                     | < 0.500                           | 0.500 | 0.0400 | mg/kg | 103 |  | 90-117 |  |  |
| Beryllium                  | < 0.500                           | 0.500 | 0.0680 | mg/kg | 97  |  | 87-110 |  |  |
| Cadmium                    | < 0.500                           | 0.500 | 0.140  | mg/kg | 100 |  | 90-114 |  |  |
| Calcium                    | < 20.0                            | 20.0  | 6.13   | mg/kg | 103 |  | 88-110 |  |  |
| Chromium                   | < 1.50                            | 1.50  | 0.590  | mg/kg | 98  |  | 85-110 |  |  |
| Cobalt                     | < 0.500                           | 0.500 | 0.190  | mg/kg | 103 |  | 90-114 |  |  |
| Copper                     | < 1.00                            | 1.00  | 0.220  | mg/kg | 105 |  | 83-112 |  |  |
| Iron                       | < 20.0                            | 20.0  | 4.71   | mg/kg | 98  |  | 61-110 |  |  |
| Lead                       | < 1.50                            | 1.50  | 0.600  | mg/kg | 101 |  | 80-120 |  |  |
| Magnesium                  | < 10.0                            | 10.0  | 2.54   | mg/kg | 100 |  | 82-110 |  |  |
| Manganese                  | < 0.500                           | 0.500 | 0.0780 | mg/kg | 103 |  | 89-112 |  |  |
| Nickel                     | < 1.00                            | 1.00  | 0.190  | mg/kg | 102 |  | 90-114 |  |  |
| Potassium                  | < 50.0                            | 50.0  | 18.0   | mg/kg | 103 |  | 78-110 |  |  |
| Selenium                   | < 2.00                            | 2.00  | 0.980  | mg/kg | 98  |  | 57-110 |  |  |
| Silver                     | < 0.500                           | 0.500 | 0.180  | mg/kg | 102 |  | 86-111 |  |  |
| Sodium                     | < 100                             | 100.  | 37.3   | mg/kg | 100 |  | 87-110 |  |  |
| Thallium                   | < 3.00                            | 3.00  | 1.45   | mg/kg | 106 |  | 90-116 |  |  |
| Vanadium                   | < 0.500                           | 0.500 | 0.190  | mg/kg | 96  |  | 79-110 |  |  |
| Zinc                       | < 2.00                            | 2.00  | 0.660  | mg/kg | 96  |  | 90-110 |  |  |

|                            |                                   |        |        |       |    |  |        |  |  |
|----------------------------|-----------------------------------|--------|--------|-------|----|--|--------|--|--|
| Batch number: 111035711001 | Sample number(s): 6256388-6256390 |        |        |       |    |  |        |  |  |
| Mercury                    | < 0.0992                          | 0.0992 | 0.0028 | mg/kg | 94 |  | 88-123 |  |  |

|                            |                                   |  |  |  |     |  |        |  |  |
|----------------------------|-----------------------------------|--|--|--|-----|--|--------|--|--|
| Batch number: 11103820005B | Sample number(s): 6256388-6256390 |  |  |  |     |  |        |  |  |
| Moisture                   |                                   |  |  |  | 100 |  | 99-101 |  |  |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>    | <u>MS %REC</u>                                   | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|-------------------------|--------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: X111061AA | Sample number(s): 6256388-6256389 UNSPK: P257457 |                 |                      |            |                |                 |                 |                |                    |
| Acetone                 | 99                                               | 108             | 15-210               | 15         | 30             |                 |                 |                |                    |
| Benzene                 | 102                                              | 103             | 55-143               | 12         | 30             |                 |                 |                |                    |
| Bromodichloromethane    | 92                                               | 95              | 53-136               | 14         | 30             |                 |                 |                |                    |
| Bromoform               | 74                                               | 79              | 38-124               | 16         | 30             |                 |                 |                |                    |
| Bromomethane            | 90                                               | 89              | 42-168               | 9          | 30             |                 |                 |                |                    |
| 2-Butanone              | 106                                              | 108             | 37-163               | 12         | 30             |                 |                 |                |                    |
| Carbon Disulfide        | 87                                               | 90              | 48-146               | 12         | 30             |                 |                 |                |                    |
| Carbon Tetrachloride    | 96                                               | 98              | 45-153               | 12         | 30             |                 |                 |                |                    |
| Chlorobenzene           | 98                                               | 99              | 49-135               | 11         | 30             |                 |                 |                |                    |
| Chloroethane            | 93                                               | 91              | 39-152               | 8          | 30             |                 |                 |                |                    |
| Chloroform              | 100                                              | 103             | 61-142               | 12         | 30             |                 |                 |                |                    |
| Chloromethane           | 95                                               | 95              | 51-163               | 10         | 30             |                 |                 |                |                    |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|-----------------------------|--------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Cyclohexane                 | 98                       | 98                        | 57-151                         | 10         | 30                       |                           |                           |                          |                              |
| 1,2-Dibromo-3-chloropropane | 81                       | 97                        | 30-139                         | 27         | 30                       |                           |                           |                          |                              |
| Dibromochloromethane        | 92                       | 99                        | 51-128                         | 16         | 30                       |                           |                           |                          |                              |
| 1,2-Dibromoethane           | 97                       | 106                       | 54-129                         | 18         | 30                       |                           |                           |                          |                              |
| 1,2-Dichlorobenzene         | 86                       | 97                        | 36-133                         | 21         | 30                       |                           |                           |                          |                              |
| 1,3-Dichlorobenzene         | 91                       | 100                       | 34-134                         | 19         | 30                       |                           |                           |                          |                              |
| 1,4-Dichlorobenzene         | 93                       | 103                       | 35-136                         | 20         | 30                       |                           |                           |                          |                              |
| Dichlorodifluoromethane     | 92                       | 87                        | 26-151                         | 4          | 30                       |                           |                           |                          |                              |
| 1,1-Dichloroethane          | 104                      | 107                       | 63-142                         | 13         | 30                       |                           |                           |                          |                              |
| 1,2-Dichloroethane          | 98                       | 101                       | 68-131                         | 13         | 30                       |                           |                           |                          |                              |
| 1,1-Dichloroethene          | 105                      | 106                       | 61-149                         | 10         | 30                       |                           |                           |                          |                              |
| cis-1,2-Dichloroethene      | 100                      | 103                       | 60-136                         | 13         | 30                       |                           |                           |                          |                              |
| trans-1,2-Dichloroethene    | 101                      | 102                       | 59-142                         | 10         | 30                       |                           |                           |                          |                              |
| 1,2-Dichloropropane         | 97                       | 100                       | 62-135                         | 13         | 30                       |                           |                           |                          |                              |
| cis-1,3-Dichloropropene     | 89                       | 93                        | 51-131                         | 15         | 30                       |                           |                           |                          |                              |
| trans-1,3-Dichloropropene   | 96                       | 100                       | 49-129                         | 14         | 30                       |                           |                           |                          |                              |
| Ethylbenzene                | 101                      | 105                       | 44-141                         | 14         | 30                       |                           |                           |                          |                              |
| Freon 113                   | 103                      | 102                       | 56-156                         | 9          | 30                       |                           |                           |                          |                              |
| 2-Hexanone                  | 106                      | 110                       | 32-160                         | 14         | 30                       |                           |                           |                          |                              |
| Isopropylbenzene            | 96                       | 96                        | 38-144                         | 10         | 30                       |                           |                           |                          |                              |
| Methyl Acetate              | 107                      | 110                       | 48-161                         | 12         | 30                       |                           |                           |                          |                              |
| Methyl Tertiary Butyl Ether | 99                       | 101                       | 55-129                         | 12         | 30                       |                           |                           |                          |                              |
| 4-Methyl-2-pentanone        | 101                      | 105                       | 46-139                         | 14         | 30                       |                           |                           |                          |                              |
| Methylcyclohexane           | 92                       | 90                        | 39-168                         | 8          | 30                       |                           |                           |                          |                              |
| Methylene Chloride          | 100                      | 101                       | 61-141                         | 11         | 30                       |                           |                           |                          |                              |
| Styrene                     | 77                       | 72                        | 35-134                         | 3          | 30                       |                           |                           |                          |                              |
| 1,1,2,2-Tetrachloroethane   | 108                      | 133                       | 40-152                         | 30         | 30                       |                           |                           |                          |                              |
| Tetrachloroethene           | 103                      | 106                       | 42-149                         | 13         | 30                       |                           |                           |                          |                              |
| Toluene                     | 110                      | 115                       | 50-146                         | 15         | 30                       |                           |                           |                          |                              |
| 1,2,4-Trichlorobenzene      | 47                       | 47                        | 10-136                         | 11         | 30                       |                           |                           |                          |                              |
| 1,1,1-Trichloroethane       | 102                      | 102                       | 64-142                         | 10         | 30                       |                           |                           |                          |                              |
| 1,1,2-Trichloroethane       | 101                      | 105                       | 54-139                         | 14         | 30                       |                           |                           |                          |                              |
| Trichloroethene             | 96                       | 98                        | 53-144                         | 12         | 30                       |                           |                           |                          |                              |
| Trichlorofluoromethane      | 104                      | 103                       | 47-163                         | 9          | 30                       |                           |                           |                          |                              |
| Vinyl Chloride              | 100                      | 103                       | 50-154                         | 13         | 30                       |                           |                           |                          |                              |
| Xylene (Total)              | 100                      | 103                       | 44-136                         | 12         | 30                       |                           |                           |                          |                              |

Batch number: 11104SLA026 Sample number(s): 6256388-6256390 UNSPK: 6256388

|                           |     |     |        |   |    |
|---------------------------|-----|-----|--------|---|----|
| Acenaphthene              | 94  | 93  | 51-135 | 2 | 30 |
| Acenaphthylene            | 97  | 95  | 47-137 | 2 | 30 |
| Acetophenone              | 88  | 90  | 38-136 | 2 | 30 |
| Anthracene                | 95  | 95  | 40-147 | 0 | 30 |
| Atrazine                  | 102 | 102 | 52-124 | 0 | 30 |
| Benzaldehyde              | 49  | 50  | 10-85  | 2 | 30 |
| Benzo(a)anthracene        | 95  | 96  | 32-150 | 0 | 30 |
| Benzo(a)pyrene            | 96  | 98  | 57-129 | 2 | 30 |
| Benzo(b)fluoranthene      | 92  | 94  | 53-131 | 2 | 30 |
| Benzo(g,h,i)perylene      | 101 | 103 | 60-123 | 2 | 30 |
| Benzo(k)fluoranthene      | 98  | 98  | 61-131 | 1 | 30 |
| 1,1'-Biphenyl             | 96  | 94  | 51-127 | 2 | 30 |
| 4-Bromophenyl-phenylether | 95  | 97  | 58-136 | 2 | 30 |
| Butylbenzylphthalate      | 107 | 107 | 42-155 | 1 | 30 |
| Di-n-butylphthalate       | 98  | 99  | 55-131 | 0 | 30 |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>         | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|------------------------------|--------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Caprolactam                  | 79                       | 79                        | 36-137                         | 1          | 30                       |                           |                           |                          |                              |
| Carbazole                    | 92                       | 92                        | 36-148                         | 0          | 30                       |                           |                           |                          |                              |
| 4-Chloro-3-methylphenol      | 88                       | 89                        | 33-144                         | 1          | 30                       |                           |                           |                          |                              |
| 4-Chloroaniline              | 75                       | 78                        | 11-114                         | 4          | 30                       |                           |                           |                          |                              |
| bis(2-Chloroethoxy)methane   | 94                       | 95                        | 60-118                         | 0          | 30                       |                           |                           |                          |                              |
| bis(2-Chloroethyl)ether      | 90                       | 93                        | 45-139                         | 3          | 30                       |                           |                           |                          |                              |
| 2-Chloronaphthalene          | 81                       | 81                        | 43-149                         | 1          | 30                       |                           |                           |                          |                              |
| 2-Chlorophenol               | 96                       | 99                        | 53-141                         | 3          | 30                       |                           |                           |                          |                              |
| 4-Chlorophenyl-phenylether   | 91                       | 91                        | 57-127                         | 1          | 30                       |                           |                           |                          |                              |
| 2,2'-oxybis(1-Chloropropane) | 86                       | 88                        | 51-124                         | 2          | 30                       |                           |                           |                          |                              |
| Chrysene                     | 92                       | 93                        | 76-114                         | 1          | 30                       |                           |                           |                          |                              |
| Dibenz(a,h)anthracene        | 102                      | 102                       | 37-151                         | 0          | 30                       |                           |                           |                          |                              |
| Dibenzofuran                 | 92                       | 93                        | 38-148                         | 0          | 30                       |                           |                           |                          |                              |
| 3,3'-Dichlorobenzidine       | 80                       | 84                        | 10-143                         | 4          | 30                       |                           |                           |                          |                              |
| 2,4-Dichlorophenol           | 95                       | 96                        | 48-141                         | 1          | 30                       |                           |                           |                          |                              |
| Diethylphthalate             | 92                       | 92                        | 52-130                         | 0          | 30                       |                           |                           |                          |                              |
| 2,4-Dimethylphenol           | 78                       | 82                        | 27-143                         | 5          | 30                       |                           |                           |                          |                              |
| Dimethylphthalate            | 92                       | 92                        | 49-134                         | 0          | 30                       |                           |                           |                          |                              |
| 4,6-Dinitro-2-methylphenol   | 48                       | 52                        | 10-148                         | 9          | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrophenol            | 29                       | 32                        | 20-143                         | 11         | 30                       |                           |                           |                          |                              |
| 2,4-Dinitrotoluene           | 89                       | 91                        | 27-147                         | 1          | 30                       |                           |                           |                          |                              |
| 2,6-Dinitrotoluene           | 90                       | 92                        | 44-140                         | 2          | 30                       |                           |                           |                          |                              |
| bis(2-Ethylhexyl)phthalate   | 110                      | 107                       | 38-151                         | 3          | 30                       |                           |                           |                          |                              |
| Fluoranthene                 | 90                       | 92                        | 48-122                         | 1          | 30                       |                           |                           |                          |                              |
| Fluorene                     | 94                       | 93                        | 46-137                         | 1          | 30                       |                           |                           |                          |                              |
| Hexachlorobenzene            | 94                       | 95                        | 53-137                         | 1          | 30                       |                           |                           |                          |                              |
| Hexachlorobutadiene          | 90                       | 89                        | 52-124                         | 1          | 30                       |                           |                           |                          |                              |
| Hexachlorocyclopentadiene    | 26                       | 25                        | 10-153                         | 2          | 30                       |                           |                           |                          |                              |
| Hexachloroethane             | 80                       | 83                        | 71-104                         | 4          | 30                       |                           |                           |                          |                              |
| Indeno(1,2,3-cd)pyrene       | 99                       | 102                       | 61-123                         | 3          | 30                       |                           |                           |                          |                              |
| Isophorone                   | 90                       | 91                        | 54-122                         | 1          | 30                       |                           |                           |                          |                              |
| 2-Methylnaphthalene          | 86                       | 88                        | 34-139                         | 1          | 30                       |                           |                           |                          |                              |
| 2-Methylphenol               | 86                       | 90                        | 30-145                         | 5          | 30                       |                           |                           |                          |                              |
| 4-Methylphenol               | 96                       | 100                       | 36-149                         | 4          | 30                       |                           |                           |                          |                              |
| Naphthalene                  | 91                       | 92                        | 52-132                         | 0          | 30                       |                           |                           |                          |                              |
| 2-Nitroaniline               | 96                       | 96                        | 46-146                         | 1          | 30                       |                           |                           |                          |                              |
| 3-Nitroaniline               | 90                       | 87                        | 34-134                         | 4          | 30                       |                           |                           |                          |                              |
| 4-Nitroaniline               | 76                       | 78                        | 26-124                         | 2          | 30                       |                           |                           |                          |                              |
| Nitrobenzene                 | 95                       | 95                        | 37-139                         | 0          | 30                       |                           |                           |                          |                              |
| 2-Nitrophenol                | 92                       | 92                        | 25-151                         | 0          | 30                       |                           |                           |                          |                              |
| 4-Nitrophenol                | 78                       | 80                        | 15-149                         | 2          | 30                       |                           |                           |                          |                              |
| N-Nitroso-di-n-propylamine   | 87                       | 89                        | 46-128                         | 1          | 30                       |                           |                           |                          |                              |
| N-Nitrosodiphenylamine       | 98                       | 100                       | 33-148                         | 2          | 30                       |                           |                           |                          |                              |
| Di-n-octylphthalate          | 102                      | 105                       | 43-149                         | 3          | 30                       |                           |                           |                          |                              |
| Pentachlorophenol            | 59                       | 61                        | 23-145                         | 3          | 30                       |                           |                           |                          |                              |
| Phenanthrene                 | 93                       | 95                        | 34-147                         | 2          | 30                       |                           |                           |                          |                              |
| Phenol                       | 91                       | 94                        | 39-151                         | 3          | 30                       |                           |                           |                          |                              |
| Pyrene                       | 101                      | 102                       | 76-124                         | 1          | 30                       |                           |                           |                          |                              |
| 2,4,5-Trichlorophenol        | 92                       | 94                        | 25-143                         | 2          | 30                       |                           |                           |                          |                              |
| 2,4,6-Trichlorophenol        | 94                       | 96                        | 41-142                         | 2          | 30                       |                           |                           |                          |                              |

Batch number: 111035708001  
Aluminum

Sample number(s): 6256388-6256390 UNSPK: P256641 BKG: P256641  
2263 2011 90-110 2 20 14,500 15,100 4

20

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name              | MS<br>%REC                                                    | MSD<br>%REC | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|----------------------------|---------------------------------------------------------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|
|                            | (2)                                                           | (2)         |                  |     |            |             |             |            |                |
| Antimony                   | 81                                                            | 83          | 75-125           | 3   | 20         | < 1.98      | < 1.94      | 200* (1)   | 20             |
| Arsenic                    | 100                                                           | 100         | 75-125           | 1   | 20         | < 1.98      | 2.89        | 38* (1)    | 20             |
| Barium                     | 102                                                           | 101         | 75-125           | 0   | 20         | 13.8        | 12.6        | 9          | 20             |
| Beryllium                  | 103                                                           | 102         | 83-111           | 0   | 20         | < 0.495     | < 0.485     | 17 (1)     | 20             |
| Cadmium                    | 103                                                           | 104         | 75-125           | 2   | 20         | < 0.495     | < 0.485     | 200* (1)   | 20             |
| Calcium                    | 91                                                            | 99          | 75-125           | 7   | 20         | 121         | 90.7        | 29* (1)    | 20             |
| Chromium                   | 114                                                           | 111         | 75-125           | 1   | 20         | 12.4        | 13.9        | 11         | 20             |
| Cobalt                     | 97                                                            | 97          | 78-113           | 1   | 20         | 0.881       | 0.816       | 8 (1)      | 20             |
| Copper                     | 108                                                           | 106         | 75-125           | 1   | 20         | 4.45        | 4.52        | 2 (1)      | 20             |
| Iron                       | 912 (2)                                                       | 591 (2)     | 75-125           | 4   | 20         | 7,920       | 8,690       | 9          | 20             |
| Lead                       | 99                                                            | 93          | 75-125           | 4   | 20         | 5.76        | 5.59        | 3 (1)      | 20             |
| Magnesium                  | 150*                                                          | 124         | 75-125           | 8   | 20         | 303         | 274         | 10         | 20             |
| Manganese                  | 94                                                            | 96          | 75-125           | 2   | 20         | 29.7        | 26.3        | 12         | 20             |
| Nickel                     | 104                                                           | 104         | 75-125           | 2   | 20         | 4.03        | 4.05        | 1 (1)      | 20             |
| Potassium                  | 122                                                           | 118         | 75-125           | 2   | 20         | 204         | 181         | 12 (1)     | 20             |
| Selenium                   | 97                                                            | 98          | 75-125           | 1   | 20         | < 1.98      | < 1.94      | 0 (1)      | 20             |
| Silver                     | 113                                                           | 111         | 75-125           | 0   | 20         | < 0.495     | < 0.485     | 0 (1)      | 20             |
| Sodium                     | 100                                                           | 96          | 75-125           | 3   | 20         | < 99.0      | < 97.1      | 0 (1)      | 20             |
| Thallium                   | 118                                                           | 117         | 75-125           | 0   | 20         | < 2.97      | < 2.91      | 0 (1)      | 20             |
| Vanadium                   | 110                                                           | 107         | 75-125           | 1   | 20         | 21.6        | 23.8        | 10         | 20             |
| Zinc                       | 99                                                            | 97          | 75-125           | 0   | 20         | 6.67        | 6.12        | 9 (1)      | 20             |
| Batch number: 111035711001 | Sample number(s): 6256388-6256390 UNSPK: P256641 BKG: P256641 |             |                  |     |            |             |             |            |                |
| Mercury                    | 98                                                            | 100         | 80-120           | 1   | 20         | < 0.0981    | < 0.0963    | 200* (1)   | 20             |
| Batch number: 11103820005B | Sample number(s): 6256388-6256390 BKG: 6256390                |             |                  |     |            |             |             |            |                |
| Moisture                   |                                                               |             |                  |     |            | 19.1        | 17.8        | 7          | 15             |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: Q111051AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6256390 | 79                   | 79                    | 74         | 75                   |
| Blank   | 93                   | 95                    | 92         | 91                   |
| LCS     | 86                   | 89                    | 84         | 83                   |
| LCSD    | 89                   | 92                    | 87         | 90                   |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111061AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6256388 | 99                   | 103                   | 94         | 97                   |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/21/11 at 05:55 PM

Group Number: 1241810

### Surrogate Quality Control

|         |     |     |     |    |
|---------|-----|-----|-----|----|
| 6256389 | 100 | 105 | 100 | 94 |
| Blank   | 104 | 106 | 93  | 98 |
| LCS     | 100 | 109 | 101 | 99 |
| MS      | 101 | 105 | 111 | 89 |
| MSD     | 100 | 105 | 112 | 82 |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: TCL 8270 (microwave)

Batch number: 11104SLA026

|         | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6256388 | 89        | 94             | 78                   | 86              | 87               | 88            |
| 6256389 | 71        | 79             | 66                   | 78              | 83               | 60            |
| 6256390 | 68        | 71             | 61                   | 71              | 70               | 66            |
| Blank   | 88        | 94             | 99                   | 86              | 94               | 90            |
| LCS     | 91        | 97             | 98                   | 91              | 97               | 90            |
| MS      | 90        | 96             | 82                   | 90              | 94               | 90            |
| MSD     | 92        | 99             | 81                   | 90              | 92               | 90            |
| Limits: | 42-130    | 39-136         | 28-139               | 55-121          | 56-121           | 43-124        |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.





**Lancaster  
Laboratories**

Acct. # 10132 Group# 1241810 Sample # 6256388-90 **COC #** 260713

0.4-1.4°

|          |                                                                                                                                                                                                                                                              |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>1</b> | Client: <u>Aquasana</u> Acct. #: _____<br>Project Name/ID: <u>Sun Philly Ref A01-10</u> PWSID #: _____<br>Project Manager: <u>T. Doerr</u> P.O. #: _____<br>Sampler: <u>T. Doerr</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u> |          |           |           |           |           |           |           |           |           | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|          | <b>Analyses Requested</b><br><b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other                                                                                                       |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|          | <b>Remarks</b>                                                                                                                                                                                                                                               |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| <b>7</b> | <b>8</b>                                                                                                                                                                                                                                                     | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>18</b> | <b>19</b> | <b>20</b> | <b>21</b> | <b>22</b> | <b>23</b> | <b>24</b> | <b>25</b> | <b>26</b> | <b>27</b> | <b>28</b> | <b>29</b> | <b>30</b> | <b>31</b> | <b>32</b> | <b>33</b> | <b>34</b> | <b>35</b> | <b>36</b> | <b>37</b> | <b>38</b> | <b>39</b> | <b>40</b> | <b>41</b> | <b>42</b> | <b>43</b> | <b>44</b> | <b>45</b> | <b>46</b> | <b>47</b> | <b>48</b> | <b>49</b> | <b>50</b> | <b>51</b> | <b>52</b> | <b>53</b> | <b>54</b> | <b>55</b> | <b>56</b> | <b>57</b> | <b>58</b> | <b>59</b> | <b>60</b> | <b>61</b> | <b>62</b> | <b>63</b> | <b>64</b> | <b>65</b> | <b>66</b> | <b>67</b> | <b>68</b> | <b>69</b> | <b>70</b> | <b>71</b> | <b>72</b> | <b>73</b> | <b>74</b> | <b>75</b> | <b>76</b> | <b>77</b> | <b>78</b> | <b>79</b> | <b>80</b> | <b>81</b> | <b>82</b> | <b>83</b> | <b>84</b> | <b>85</b> | <b>86</b> | <b>87</b> | <b>88</b> | <b>89</b> | <b>90</b> | <b>91</b> | <b>92</b> | <b>93</b> | <b>94</b> | <b>95</b> | <b>96</b> | <b>97</b> | <b>98</b> | <b>99</b> | <b>100</b> |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|          |                                                                                                                                                                                                                                                              |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |            | <b>101</b> | <b>102</b> | <b>103</b> | <b>104</b> | <b>105</b> | <b>106</b> | <b>107</b> | <b>108</b> | <b>109</b> | <b>110</b> | <b>111</b> | <b>112</b> | <b>113</b> | <b>114</b> | <b>115</b> | <b>116</b> | <b>117</b> | <b>118</b> | <b>119</b> | <b>120</b> | <b>121</b> | <b>122</b> |

Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-6766  
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

Issued by Dept. 6042 Management  
2102.05

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions, and Lancaster hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 29, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/08/2011  
Group Number: 1241316  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionSED-1\_040711 Grab Soil  
SED-2\_040711 Grab Soil  
SED-3\_040711 Grab Soil  
SED-4\_040711 Grab Soil  
SED-5\_040711 Grab SoilLancaster Labs (LLI) #6253879  
6253880  
6253881  
6253882  
6253883

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC Langan

COPY TO

Attn: Dennis Webster

ELECTRONIC SUN: Aquaterra Tech.

COPY TO

Attn: Tiffani Doerr

ELECTRONIC LLI

COPY TO

Attn: EDD Group

ELECTRONIC Langan

COPY TO

Attn: Kristen Ward

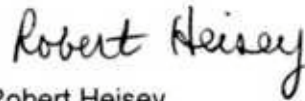
ELECTRONIC Aquaterra Tech

COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Robert Heisey  
Senior Specialist

**Sample Description:** SED-1\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-1\_040711

LLI Sample # SW 6253879  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-1

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 10           | 10                         | 1                          | 1.06            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | Ethylbenzene                | 100-41-4            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 10         | 10                         | 2                          | 1.06            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 10         | 10                         | 1                          | 1.06            |
| 10950        | Toluene                     | 108-88-3            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 10         | 10                         | 2                          | 1.06            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 10         | 10                         | 2                          | 1.06            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 10         | 10                         | 2                          | 1.06            |
| <b>GC/MS</b> | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10728        | Benzenethiol                | 108-98-5            | < 18,000     | 18,000                     | 6,200                      | 10              |
| 10728        | Benzo(k)fluoranthene        | 207-08-9            | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | Butylbenzylphthalate        | 85-68-7             | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | Di-n-butylphthalate         | 84-74-2             | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | Dibenz(a,h)acridine         | 226-36-8            | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | Dibenz(a,h)anthracene       | 53-70-3             | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | Diethylphthalate            | 84-66-2             | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | 2,4-Dimethylphenol          | 105-67-9            | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | Dimethylphthalate           | 131-11-3            | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | 2,4-Dinitrophenol           | 51-28-5             | < 18,000     | 18,000                     | 6,200                      | 10              |
| 10728        | bis(2-Ethylhexyl)phthalate  | 117-81-7            | < 6,200      | 6,200                      | 1,200                      | 10              |
| 10728        | Fluoranthene                | 206-44-0            | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | 6-Methylchrysene            | 1705-85-7           | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | 2-Methylphenol              | 95-48-7             | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | 2-Nitrophenol               | 88-75-5             | < 3,100      | 3,100                      | 620                        | 10              |
| 10728        | Di-n-octylphthalate         | 117-84-0            | < 3,100      | 3,100                      | 1,200                      | 10              |
| 10728        | Phenol                      | 108-95-2            | < 3,100      | 3,100                      | 620                        | 10              |

Reporting limits were raised due to interference from the sample matrix.

A separate LCS/LCSD for benzenethiol were performed due to the instability of benzenethiol in a spike solution. The MS/MSD associated with this sample was not spiked with benzenethiol.

|              |                      |                         |              |              |              |     |
|--------------|----------------------|-------------------------|--------------|--------------|--------------|-----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C SIM</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |     |
| 10722        | Anthracene           | 120-12-7                | 660          | 31           | 6.1          | 10  |
| 10722        | Benzo(a)anthracene   | 56-55-3                 | 520          | 31           | 12           | 10  |
| 10722        | Benzo(a)pyrene       | 50-32-8                 | 540          | 31           | 12           | 10  |
| 10722        | Benzo(b)fluoranthene | 205-99-2                | 550          | 31           | 12           | 10  |
| 10722        | Benzo(g,h,i)perylene | 191-24-2                | 640          | 31           | 12           | 10  |
| 10722        | Chrysene             | 218-01-9                | 890          | 31           | 6.1          | 10  |
| 10722        | Fluorene             | 86-73-7                 | 360          | 31           | 12           | 10  |
| 10722        | 1-Methylnaphthalene  | 90-12-0                 | 6,000        | 310          | 120          | 100 |
| 10722        | Naphthalene          | 91-20-3                 | 7,700        | 310          | 120          | 100 |
| 10722        | Phenanthrene         | 85-01-8                 | 2,300        | 31           | 12           | 10  |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SED-1\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-1\_040711

LLI Sample # SW 6253879  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-1

| CAT No.                                                                                                                                                                                                                                   | Analysis Name                 | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Semivolatiles SW-846 8270C SIM ug/kg</b>                                                                                                                                                                                         |                               |            |            |                            |                            |                 |
| 10722                                                                                                                                                                                                                                     | Pyrene                        | 129-00-0   | 1,200      | 31                         | 12                         | 10              |
| The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance: |                               |            |            |                            |                            |                 |
| pyrene                                                                                                                                                                                                                                    |                               |            |            |                            |                            |                 |
| <b>Metals SW-846 6010B mg/kg</b>                                                                                                                                                                                                          |                               |            |            |                            |                            |                 |
| 01643                                                                                                                                                                                                                                     | Aluminum                      | 7429-90-5  | 15,400     | 36.4                       | 9.15                       | 1               |
| 06944                                                                                                                                                                                                                                     | Antimony                      | 7440-36-0  | < 3.64     | 3.64                       | 1.82                       | 1               |
| 06935                                                                                                                                                                                                                                     | Arsenic                       | 7440-38-2  | 24.0       | 3.64                       | 1.73                       | 1               |
| 06946                                                                                                                                                                                                                                     | Barium                        | 7440-39-3  | 331        | 0.909                      | 0.0728                     | 1               |
| 06947                                                                                                                                                                                                                                     | Beryllium                     | 7440-41-7  | 1.12       | 0.909                      | 0.124                      | 1               |
| 06949                                                                                                                                                                                                                                     | Cadmium                       | 7440-43-9  | 2.22       | 0.909                      | 0.255                      | 1               |
| 01650                                                                                                                                                                                                                                     | Calcium                       | 7440-70-2  | 4,150      | 36.4                       | 11.1                       | 1               |
| 06951                                                                                                                                                                                                                                     | Chromium                      | 7440-47-3  | 89.7       | 2.73                       | 1.07                       | 1               |
| 06952                                                                                                                                                                                                                                     | Cobalt                        | 7440-48-4  | 15.0       | 0.909                      | 0.346                      | 1               |
| 06953                                                                                                                                                                                                                                     | Copper                        | 7440-50-8  | 573        | 1.82                       | 0.400                      | 1               |
| 01654                                                                                                                                                                                                                                     | Iron                          | 7439-89-6  | 44,500     | 36.4                       | 8.57                       | 1               |
| 06955                                                                                                                                                                                                                                     | Lead                          | 7439-92-1  | 3,610      | 13.6                       | 5.46                       | 5               |
| 01657                                                                                                                                                                                                                                     | Magnesium                     | 7439-95-4  | 3,370      | 18.2                       | 4.62                       | 1               |
| 06958                                                                                                                                                                                                                                     | Manganese                     | 7439-96-5  | 461        | 0.909                      | 0.142                      | 1               |
| 06961                                                                                                                                                                                                                                     | Nickel                        | 7440-02-0  | 45.6       | 1.82                       | 0.346                      | 1               |
| 01662                                                                                                                                                                                                                                     | Potassium                     | 7440-09-7  | 1,780      | 90.9                       | 32.7                       | 1               |
| 06936                                                                                                                                                                                                                                     | Selenium                      | 7782-49-2  | 5.30       | 3.64                       | 1.78                       | 1               |
| 06966                                                                                                                                                                                                                                     | Silver                        | 7440-22-4  | 2.96       | 0.909                      | 0.327                      | 1               |
| 01667                                                                                                                                                                                                                                     | Sodium                        | 7440-23-5  | 264        | 182                        | 67.8                       | 1               |
| 06925                                                                                                                                                                                                                                     | Thallium                      | 7440-28-0  | < 5.46     | 5.46                       | 2.64                       | 1               |
| 06971                                                                                                                                                                                                                                     | Vanadium                      | 7440-62-2  | 68.0       | 0.909                      | 0.346                      | 1               |
| 06972                                                                                                                                                                                                                                     | Zinc                          | 7440-66-6  | 503        | 3.64                       | 1.20                       | 1               |
| <b>SW-846 7471A mg/kg</b>                                                                                                                                                                                                                 |                               |            |            |                            |                            |                 |
| 00159                                                                                                                                                                                                                                     | Mercury                       | 7439-97-6  | 3.59       | 0.882                      | 0.0253                     | 5               |
| <b>Wet Chemistry SM20 5310 B modified mg/kg</b>                                                                                                                                                                                           |                               |            |            |                            |                            |                 |
| 02079                                                                                                                                                                                                                                     | TOC Solids/Sludges Combustion | n.a.       | 302,000    | 18,300                     | 6,100                      | 1               |
| <b>Wet Chemistry ASTM D422 % Passing</b>                                                                                                                                                                                                  |                               |            |            |                            |                            |                 |
| 07103                                                                                                                                                                                                                                     | 75 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 37.5 mm                       | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 19 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 4.75 mm                       | n.a.       | 84.6       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 3.35 mm                       | n.a.       | 78.3       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 2.36 mm                       | n.a.       | 68.8       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 1.18 mm                       | n.a.       | 60.7       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.6 mm                        | n.a.       | 52.3       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.3 mm                        | n.a.       | 45.0       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.15 mm                       | n.a.       | 37.3       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.075 mm                      | n.a.       | 30.7       | 1.0                        | 0.50                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-1\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-1\_040711

LLI Sample # SW 6253879  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:40 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-1

| CAT No.              | Analysis Name | CAS Number       | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|---------------|------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |               | <b>ASTM D422</b> | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                | 0.064 mm      | n.a.             | 28.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.05 mm       | n.a.             | 22.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.02 mm       | n.a.             | 13.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.005 mm      | n.a.             | 6.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.002 mm      | n.a.             | 2.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.001 mm      | n.a.             | 1.0              | 1.0                        | 0.50                       | 1               |

|                                                                                                                                                                       |          |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  |          | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture | n.a.               | 46.1     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                   | Method           | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------------|------------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Iso/TMB/D CBs | SW-846 8260B     | 1      | X111021AA    | 04/12/2011 05:11       | Stephanie A Selis   | 1.06            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC  | SW-846 5035      | 1      | 201109824067 | 04/07/2011 13:40       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 1      | 201109824067 | 04/07/2011 13:40       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 2      | 201109824067 | 04/07/2011 13:40       | Client Supplied     | 1               |
| 10728   | Skinner 8270 (microwave)        | SW-846 8270C     | 1      | 11102SLC026  | 04/14/2011 23:42       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/13/2011 21:20       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/14/2011 06:33       | Joseph M Gambler    | 100             |
| 10810   | BNA Soil Microwave SIM PAH      | SW-846 3546      | 1      | 11102SLG026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 10812   | BNA Soil Microwave Skinner      | SW-846 3546      | 1      | 11102SLC026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 01643   | Aluminum                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06944   | Antimony                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06935   | Arsenic                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 13:58       | Joanne M Gates      | 1               |
| 06946   | Barium                          | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06947   | Beryllium                       | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06949   | Cadmium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 01650   | Calcium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06951   | Chromium                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II    | 1               |
| 06952   | Cobalt                          | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 13:58       | Joanne M Gates      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-1\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-1\_040711

**LLI Sample #** SW 6253879  
**LLI Group #** 1241316  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 13:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/08/2011 14:10

West Chester PA 19381

**Reported:** 04/29/2011 13:53

SED-1

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06953   | Copper                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 01654   | Iron                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06955   | Lead                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:01       | Joanne M Gates   | 5               |
| 01657   | Magnesium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06958   | Manganese                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06961   | Nickel                        | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 13:58       | Joanne M Gates   | 1               |
| 01662   | Potassium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06936   | Selenium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 13:58       | Joanne M Gates   | 1               |
| 06966   | Silver                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 01667   | Sodium                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06925   | Thallium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 13:58       | Joanne M Gates   | 1               |
| 06971   | Vanadium                      | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 06972   | Zinc                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:16       | John W Yanzuk II | 1               |
| 00159   | Mercury                       | SW-846 7471A          | 1      | 111015711003 | 04/13/2011 09:56       | Damary Valentin  | 5               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B          | 1      | 111015708004 | 04/12/2011 09:58       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest            | SW-846 7471A modified | 1      | 111015711003 | 04/12/2011 10:55       | Denise K Conners | 1               |
| 02079   | TOC Solids/Sludges Combustion | SM20 5310 B modified  | 2      | 11101049531A | 04/12/2011 21:39       | James S Mathiot  | 1               |
| 07103   | Grain Size to 1 um            | ASTM D422             | 1      | 11098710301A | 04/08/2011 22:00       | Luz M Groff      | 1               |
| 00111   | Moisture                      | SM20 2540 G           | 1      | 11103820003A | 04/13/2011 20:31       | Scott W Freisher | 1               |



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 4

**Sample Description:** SED-2\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-2\_040711

LLI Sample # SW 6253880  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-2

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 14         | 14                         | 1                          | 1.15            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | Ethylbenzene                | 100-41-4            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 14         | 14                         | 3                          | 1.15            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 14         | 14                         | 1                          | 1.15            |
| 10950        | Toluene                     | 108-88-3            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 14         | 14                         | 3                          | 1.15            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 14         | 14                         | 3                          | 1.15            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 14         | 14                         | 3                          | 1.15            |

|              |                            |                     |              |              |              |    |
|--------------|----------------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b>       | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10728        | Benzenethiol               | 108-98-5            | < 24,000     | 24,000       | 7,900        | 10 |
| 10728        | Benzo(k)fluoranthene       | 207-08-9            | < 4,000      | 4,000        | 790          | 10 |
| 10728        | Butylbenzylphthalate       | 85-68-7             | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | Di-n-butylphthalate        | 84-74-2             | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | Dibenz(a,h)acridine        | 226-36-8            | < 4,000      | 4,000        | 790          | 10 |
| 10728        | Dibenz(a,h)anthracene      | 53-70-3             | < 4,000      | 4,000        | 790          | 10 |
| 10728        | Diethylphthalate           | 84-66-2             | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | 2,4-Dimethylphenol         | 105-67-9            | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | Dimethylphthalate          | 131-11-3            | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | 2,4-Dinitrophenol          | 51-28-5             | < 24,000     | 24,000       | 7,900        | 10 |
| 10728        | bis(2-Ethylhexyl)phthalate | 117-81-7            | < 7,900      | 7,900        | 1,600        | 10 |
| 10728        | Fluoranthene               | 206-44-0            | < 4,000      | 4,000        | 790          | 10 |
| 10728        | 6-Methylchrysene           | 1705-85-7           | < 4,000      | 4,000        | 790          | 10 |
| 10728        | 2-Methylphenol             | 95-48-7             | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | 2-Nitrophenol              | 88-75-5             | < 4,000      | 4,000        | 790          | 10 |
| 10728        | Di-n-octylphthalate        | 117-84-0            | < 4,000      | 4,000        | 1,600        | 10 |
| 10728        | Phenol                     | 108-95-2            | < 4,000      | 4,000        | 790          | 10 |

Reporting limits were raised due to interference from the sample matrix.

A separate LCS/LCSD for benzenethiol were performed due to the instability of benzenethiol in a spike solution. The MS/MSD associated with this sample was not spiked with benzenethiol.

|              |                      |                         |              |              |              |    |
|--------------|----------------------|-------------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C SIM</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10722        | Anthracene           | 120-12-7                | < 39         | 39           | 7.9          | 10 |
| 10722        | Benzo(a)anthracene   | 56-55-3                 | < 39         | 39           | 16           | 10 |
| 10722        | Benzo(a)pyrene       | 50-32-8                 | < 39         | 39           | 16           | 10 |
| 10722        | Benzo(b)fluoranthene | 205-99-2                | < 39         | 39           | 16           | 10 |
| 10722        | Benzo(g,h,i)perylene | 191-24-2                | < 39         | 39           | 16           | 10 |
| 10722        | Chrysene             | 218-01-9                | < 39         | 39           | 7.9          | 10 |
| 10722        | Fluorene             | 86-73-7                 | < 39         | 39           | 16           | 10 |
| 10722        | 1-Methylnaphthalene  | 90-12-0                 | < 39         | 39           | 16           | 10 |
| 10722        | Naphthalene          | 91-20-3                 | < 39         | 39           | 16           | 10 |
| 10722        | Phenanthrene         | 85-01-8                 | < 39         | 39           | 16           | 10 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-2\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-2\_040711

LLI Sample # SW 6253880  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-2

| CAT No.                                                                                                                                                                                                                                   | Analysis Name                 | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Semivolatiles</b>                                                                                                                                                                                                                |                               |            |            |                            |                            |                 |
|                                                                                                                                                                                                                                           | SW-846 8270C SIM              |            | ug/kg      | ug/kg                      | ug/kg                      |                 |
| 10722                                                                                                                                                                                                                                     | Pyrene                        | 129-00-0   | < 39       | 39                         | 16                         | 10              |
| Reporting limits were raised due to interference from the sample matrix.                                                                                                                                                                  |                               |            |            |                            |                            |                 |
| The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance: |                               |            |            |                            |                            |                 |
| Pyrene                                                                                                                                                                                                                                    |                               |            |            |                            |                            |                 |
| <b>Metals</b>                                                                                                                                                                                                                             |                               |            |            |                            |                            |                 |
|                                                                                                                                                                                                                                           | SW-846 6010B                  |            | mg/kg      | mg/kg                      | mg/kg                      |                 |
| 01643                                                                                                                                                                                                                                     | Aluminum                      | 7429-90-5  | 35,900     | 47.5                       | 11.9                       | 1               |
| 06944                                                                                                                                                                                                                                     | Antimony                      | 7440-36-0  | < 4.75     | 4.75                       | 2.38                       | 1               |
| 06935                                                                                                                                                                                                                                     | Arsenic                       | 7440-38-2  | 91.7       | 4.75                       | 2.26                       | 1               |
| 06946                                                                                                                                                                                                                                     | Barium                        | 7440-39-3  | 832        | 1.19                       | 0.0950                     | 1               |
| 06947                                                                                                                                                                                                                                     | Beryllium                     | 7440-41-7  | < 1.19     | 1.19                       | 0.162                      | 1               |
| 06949                                                                                                                                                                                                                                     | Cadmium                       | 7440-43-9  | 2.03       | 1.19                       | 0.333                      | 1               |
| 01650                                                                                                                                                                                                                                     | Calcium                       | 7440-70-2  | 166,000    | 238                        | 72.8                       | 5               |
| 06951                                                                                                                                                                                                                                     | Chromium                      | 7440-47-3  | 186        | 3.56                       | 1.40                       | 1               |
| 06952                                                                                                                                                                                                                                     | Cobalt                        | 7440-48-4  | 14.2       | 1.19                       | 0.451                      | 1               |
| 06953                                                                                                                                                                                                                                     | Copper                        | 7440-50-8  | 425        | 2.38                       | 0.523                      | 1               |
| 01654                                                                                                                                                                                                                                     | Iron                          | 7439-89-6  | 21,300     | 47.5                       | 11.2                       | 1               |
| 06955                                                                                                                                                                                                                                     | Lead                          | 7439-92-1  | 897        | 3.56                       | 1.43                       | 1               |
| 01657                                                                                                                                                                                                                                     | Magnesium                     | 7439-95-4  | 31,600     | 23.8                       | 6.03                       | 1               |
| 06958                                                                                                                                                                                                                                     | Manganese                     | 7439-96-5  | 1,140      | 1.19                       | 0.185                      | 1               |
| 06961                                                                                                                                                                                                                                     | Nickel                        | 7440-02-0  | 207        | 2.38                       | 0.451                      | 1               |
| 01662                                                                                                                                                                                                                                     | Potassium                     | 7440-09-7  | 1,300      | 119                        | 42.8                       | 1               |
| 06936                                                                                                                                                                                                                                     | Selenium                      | 7782-49-2  | < 4.75     | 4.75                       | 2.33                       | 1               |
| 06966                                                                                                                                                                                                                                     | Silver                        | 7440-22-4  | 2.01       | 1.19                       | 0.428                      | 1               |
| 01667                                                                                                                                                                                                                                     | Sodium                        | 7440-23-5  | 793        | 238                        | 88.6                       | 1               |
| 06925                                                                                                                                                                                                                                     | Thallium                      | 7440-28-0  | < 7.13     | 7.13                       | 3.44                       | 1               |
| 06971                                                                                                                                                                                                                                     | Vanadium                      | 7440-62-2  | 287        | 1.19                       | 0.451                      | 1               |
| 06972                                                                                                                                                                                                                                     | Zinc                          | 7440-66-6  | 738        | 4.75                       | 1.57                       | 1               |
| <b>SW-846 7471A</b>                                                                                                                                                                                                                       |                               |            |            |                            |                            |                 |
|                                                                                                                                                                                                                                           |                               |            | mg/kg      | mg/kg                      | mg/kg                      |                 |
| 00159                                                                                                                                                                                                                                     | Mercury                       | 7439-97-6  | < 0.229    | 0.229                      | 0.0066                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      |                               |            |            |                            |                            |                 |
|                                                                                                                                                                                                                                           | SM20 5310 B modified          |            | mg/kg      | mg/kg                      | mg/kg                      |                 |
| 02079                                                                                                                                                                                                                                     | TOC Solids/Sludges Combustion | n.a.       | 16,100     | 6,490                      | 2,160                      | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      |                               |            |            |                            |                            |                 |
|                                                                                                                                                                                                                                           | ASTM D422                     |            | % Passing  | % Passing                  | % Passing                  |                 |
| 07103                                                                                                                                                                                                                                     | 75 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 37.5 mm                       | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 19 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 4.75 mm                       | n.a.       | 88.2       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 3.35 mm                       | n.a.       | 84.0       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 2.36 mm                       | n.a.       | 79.0       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 1.18 mm                       | n.a.       | 65.0       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.6 mm                        | n.a.       | 48.1       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.3 mm                        | n.a.       | 23.3       | 1.0                        | 0.50                       | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SED-2\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-2\_040711

LLI Sample # SW 6253880  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-2

| CAT No.              | Analysis Name | CAS Number       | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|---------------|------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |               | <b>ASTM D422</b> | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                | 0.15 mm       | n.a.             | 14.4             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.075 mm      | n.a.             | 11.6             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.064 mm      | n.a.             | 10.5             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.05 mm       | n.a.             | 8.5              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.02 mm       | n.a.             | 4.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.005 mm      | n.a.             | < 1.0            | 1.0                        | 0.50                       | 1               |
| 07103                | 0.002 mm      | n.a.             | < 1.0            | 1.0                        | 0.50                       | 1               |
| 07103                | 0.001 mm      | n.a.             | < 1.0            | 1.0                        | 0.50                       | 1               |

|                                                                                                                                                                       |          |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  |          | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture | n.a.               | 57.9     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                   | Method           | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------------|------------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Iso/TMB/D CBs | SW-846 8260B     | 1      | X111021AA    | 04/12/2011 05:47       | Stephanie A Selis   | 1.15            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC  | SW-846 5035      | 1      | 201109824067 | 04/07/2011 13:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 1      | 201109824067 | 04/07/2011 13:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 2      | 201109824067 | 04/07/2011 13:00       | Client Supplied     | 1               |
| 10728   | Skinner 8270 (microwave)        | SW-846 8270C     | 1      | 11102SLC026  | 04/15/2011 00:59       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/14/2011 07:05       | Joseph M Gambler    | 10              |
| 10810   | BNA Soil Microwave SIM PAH      | SW-846 3546      | 1      | 11102SLG026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 10812   | BNA Soil Microwave Skinner      | SW-846 3546      | 1      | 11102SLC026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 01643   | Aluminum                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 06944   | Antimony                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 06935   | Arsenic                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates      | 1               |
| 06946   | Barium                          | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 06947   | Beryllium                       | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 06949   | Cadmium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 01650   | Calcium                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:09       | Joanne M Gates      | 5               |
| 06951   | Chromium                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II    | 1               |
| 06952   | Cobalt                          | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-2\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-2\_040711

LLI Sample # SW 6253880  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/29/2011 13:53

SED-2

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06953   | Copper                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 01654   | Iron                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06955   | Lead                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates   | 1               |
| 01657   | Magnesium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06958   | Manganese                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06961   | Nickel                        | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates   | 1               |
| 01662   | Potassium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06936   | Selenium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates   | 1               |
| 06966   | Silver                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 01667   | Sodium                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06925   | Thallium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:05       | Joanne M Gates   | 1               |
| 06971   | Vanadium                      | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 06972   | Zinc                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:26       | John W Yanzuk II | 1               |
| 00159   | Mercury                       | SW-846 7471A          | 1      | 111015711003 | 04/13/2011 08:51       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B          | 1      | 111015708004 | 04/12/2011 09:58       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest            | SW-846 7471A modified | 1      | 111015711003 | 04/12/2011 10:55       | Denise K Conners | 1               |
| 02079   | TOC Solids/Sludges Combustion | SM20 5310 B modified  | 1      | 11101049531A | 04/12/2011 00:53       | James S Mathiot  | 1               |
| 07103   | Grain Size to 1 um            | ASTM D422             | 1      | 11098710301A | 04/08/2011 22:00       | Luz M Groff      | 1               |
| 00111   | Moisture                      | SM20 2540 G           | 1      | 11103820003A | 04/13/2011 20:31       | Scott W Freisher | 1               |

**Sample Description:** SED-3\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-3\_040711

LLI Sample # SW 6253881  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:50 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-3

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 10           | 6                          | 0.6                        | 0.81            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 6          | 6                          | 1                          | 0.81            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.81            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.81            |
| 10950        | Toluene                     | 108-88-3            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 7            | 6                          | 1                          | 0.81            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 6          | 6                          | 1                          | 0.81            |
| 10950        | Xylene (Total)              | 1330-20-7           | 10           | 6                          | 1                          | 0.81            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                            |                     |              |              |              |    |
|--------------|----------------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b>       | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10728        | Benzenethiol               | 108-98-5            | < 14,000     | 14,000       | 4,800        | 10 |
| 10728        | Benzo(k)fluoranthene       | 207-08-9            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Butylbenzylphthalate       | 85-68-7             | < 2,400      | 2,400        | 950          | 10 |
| 10728        | Di-n-butylphthalate        | 84-74-2             | < 2,400      | 2,400        | 950          | 10 |
| 10728        | Dibenz(a,h)acridine        | 226-36-8            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Dibenz(a,h)anthracene      | 53-70-3             | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Diethylphthalate           | 84-66-2             | < 2,400      | 2,400        | 950          | 10 |
| 10728        | 2,4-Dimethylphenol         | 105-67-9            | < 2,400      | 2,400        | 950          | 10 |
| 10728        | Dimethylphthalate          | 131-11-3            | < 2,400      | 2,400        | 950          | 10 |
| 10728        | 2,4-Dinitrophenol          | 51-28-5             | < 14,000     | 14,000       | 4,800        | 10 |
| 10728        | bis(2-Ethylhexyl)phthalate | 117-81-7            | < 4,800      | 4,800        | 950          | 10 |
| 10728        | Fluoranthene               | 206-44-0            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | 6-Methylchrysene           | 1705-85-7           | < 2,400      | 2,400        | 480          | 10 |
| 10728        | 2-Methylphenol             | 95-48-7             | < 2,400      | 2,400        | 950          | 10 |
| 10728        | 2-Nitrophenol              | 88-75-5             | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Di-n-octylphthalate        | 117-84-0            | < 2,400      | 2,400        | 950          | 10 |
| 10728        | Phenol                     | 108-95-2            | < 2,400      | 2,400        | 480          | 10 |

Reporting limits were raised due to interference from the sample matrix.

A separate LCS/LCSD for benzenethiol were performed due to the instability of benzenethiol in a spike solution. The MS/MSD associated with this sample was not spiked with benzenethiol.

|              |                      |                         |              |              |              |    |
|--------------|----------------------|-------------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C SIM</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10722        | Anthracene           | 120-12-7                | 180          | 24           | 4.7          | 10 |
| 10722        | Benzo(a)anthracene   | 56-55-3                 | 600          | 24           | 9.5          | 10 |
| 10722        | Benzo(a)pyrene       | 50-32-8                 | 370          | 24           | 9.5          | 10 |
| 10722        | Benzo(b)fluoranthene | 205-99-2                | 640          | 24           | 9.5          | 10 |
| 10722        | Benzo(g,h,i)perylene | 191-24-2                | 190          | 24           | 9.5          | 10 |
| 10722        | Chrysene             | 218-01-9                | 1,100        | 24           | 4.7          | 10 |
| 10722        | Fluorene             | 86-73-7                 | 46           | 24           | 9.5          | 10 |
| 10722        | 1-Methylnaphthalene  | 90-12-0                 | 34           | 24           | 9.5          | 10 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-3\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-3\_040711

LLI Sample # SW 6253881  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:50 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-3

| CAT No.                                                                                                                                                                                                                                   | Analysis Name                 | CAS Number | Dry Result | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------|------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Semivolatiles SW-846 8270C SIM ug/kg</b>                                                                                                                                                                                         |                               |            |            |                            |                            |                 |
| 10722                                                                                                                                                                                                                                     | Naphthalene                   | 91-20-3    | 70         | 24                         | 9.5                        | 10              |
| 10722                                                                                                                                                                                                                                     | Phenanthrene                  | 85-01-8    | 430        | 24                         | 9.5                        | 10              |
| 10722                                                                                                                                                                                                                                     | Pyrene                        | 129-00-0   | 1,600      | 24                         | 9.5                        | 10              |
| The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance: |                               |            |            |                            |                            |                 |
| pyrene                                                                                                                                                                                                                                    |                               |            |            |                            |                            |                 |
| <b>Metals SW-846 6010B mg/kg</b>                                                                                                                                                                                                          |                               |            |            |                            |                            |                 |
| 01643                                                                                                                                                                                                                                     | Aluminum                      | 7429-90-5  | 12,300     | 28.4                       | 7.15                       | 1               |
| 06944                                                                                                                                                                                                                                     | Antimony                      | 7440-36-0  | < 2.84     | 2.84                       | 1.42                       | 1               |
| 06935                                                                                                                                                                                                                                     | Arsenic                       | 7440-38-2  | 7.48       | 2.84                       | 1.35                       | 1               |
| 06946                                                                                                                                                                                                                                     | Barium                        | 7440-39-3  | 236        | 0.710                      | 0.0568                     | 1               |
| 06947                                                                                                                                                                                                                                     | Beryllium                     | 7440-41-7  | < 0.710    | 0.710                      | 0.0966                     | 1               |
| 06949                                                                                                                                                                                                                                     | Cadmium                       | 7440-43-9  | 1.58       | 0.710                      | 0.199                      | 1               |
| 01650                                                                                                                                                                                                                                     | Calcium                       | 7440-70-2  | 7,130      | 28.4                       | 8.71                       | 1               |
| 06951                                                                                                                                                                                                                                     | Chromium                      | 7440-47-3  | 45.2       | 2.13                       | 0.838                      | 1               |
| 06952                                                                                                                                                                                                                                     | Cobalt                        | 7440-48-4  | 8.29       | 0.710                      | 0.270                      | 1               |
| 06953                                                                                                                                                                                                                                     | Copper                        | 7440-50-8  | 111        | 1.42                       | 0.313                      | 1               |
| 01654                                                                                                                                                                                                                                     | Iron                          | 7439-89-6  | 19,300     | 28.4                       | 6.69                       | 1               |
| 06955                                                                                                                                                                                                                                     | Lead                          | 7439-92-1  | 328        | 2.13                       | 0.852                      | 1               |
| 01657                                                                                                                                                                                                                                     | Magnesium                     | 7439-95-4  | 6,940      | 14.2                       | 3.61                       | 1               |
| 06958                                                                                                                                                                                                                                     | Manganese                     | 7439-96-5  | 236        | 0.710                      | 0.111                      | 1               |
| 06961                                                                                                                                                                                                                                     | Nickel                        | 7440-02-0  | 31.3       | 1.42                       | 0.270                      | 1               |
| 01662                                                                                                                                                                                                                                     | Potassium                     | 7440-09-7  | 2,290      | 71.0                       | 25.6                       | 1               |
| 06936                                                                                                                                                                                                                                     | Selenium                      | 7782-49-2  | < 2.84     | 2.84                       | 1.39                       | 1               |
| 06966                                                                                                                                                                                                                                     | Silver                        | 7440-22-4  | 0.969      | 0.710                      | 0.256                      | 1               |
| 01667                                                                                                                                                                                                                                     | Sodium                        | 7440-23-5  | 295        | 142                        | 53.0                       | 1               |
| 06925                                                                                                                                                                                                                                     | Thallium                      | 7440-28-0  | < 4.26     | 4.26                       | 2.06                       | 1               |
| 06971                                                                                                                                                                                                                                     | Vanadium                      | 7440-62-2  | 50.1       | 0.710                      | 0.270                      | 1               |
| 06972                                                                                                                                                                                                                                     | Zinc                          | 7440-66-6  | 503        | 2.84                       | 0.938                      | 1               |
| <b>SW-846 7471A mg/kg</b>                                                                                                                                                                                                                 |                               |            |            |                            |                            |                 |
| 00159                                                                                                                                                                                                                                     | Mercury                       | 7439-97-6  | 0.604      | 0.139                      | 0.0040                     | 1               |
| <b>Wet Chemistry SM20 5310 B modified mg/kg</b>                                                                                                                                                                                           |                               |            |            |                            |                            |                 |
| 02079                                                                                                                                                                                                                                     | TOC Solids/Sludges Combustion | n.a.       | 55,900     | 3,490                      | 1,160                      | 1               |
| <b>Wet Chemistry ASTM D422 % Passing</b>                                                                                                                                                                                                  |                               |            |            |                            |                            |                 |
| 07103                                                                                                                                                                                                                                     | 75 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 37.5 mm                       | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 19 mm                         | n.a.       | 100        | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 4.75 mm                       | n.a.       | 74.1       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 3.35 mm                       | n.a.       | 66.5       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 2.36 mm                       | n.a.       | 60.7       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 1.18 mm                       | n.a.       | 54.4       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.6 mm                        | n.a.       | 44.7       | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.3 mm                        | n.a.       | 26.3       | 1.0                        | 0.50                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-3\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-3\_040711

LLI Sample # SW 6253881  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:50 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-3

| CAT No.              | Analysis Name | CAS Number       | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|---------------|------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |               | <b>ASTM D422</b> | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                | 0.15 mm       | n.a.             | 14.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.075 mm      | n.a.             | 9.5              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.064 mm      | n.a.             | 9.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.05 mm       | n.a.             | 7.5              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.02 mm       | n.a.             | 3.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.005 mm      | n.a.             | 1.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.002 mm      | n.a.             | < 1.0            | 1.0                        | 0.50                       | 1               |
| 07103                | 0.001 mm      | n.a.             | < 1.0            | 1.0                        | 0.50                       | 1               |

|                                                                                                                                                                       |          |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  |          | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture | n.a.               | 30.3     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                   | Method           | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------------|------------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Iso/TMB/D CBs | SW-846 8260B     | 1      | X111021AA    | 04/12/2011 06:10       | Stephanie A Selis   | 0.81            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC  | SW-846 5035      | 1      | 201109824067 | 04/07/2011 11:50       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 1      | 201109824067 | 04/07/2011 11:50       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 2      | 201109824067 | 04/07/2011 11:50       | Client Supplied     | 1               |
| 10728   | Skinner 8270 (microwave)        | SW-846 8270C     | 1      | 11102SLC026  | 04/15/2011 01:25       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/14/2011 07:37       | Joseph M Gambler    | 10              |
| 10810   | BNA Soil Microwave SIM PAH      | SW-846 3546      | 1      | 11102SLG026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 10812   | BNA Soil Microwave Skinner      | SW-846 3546      | 1      | 11102SLC026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 01643   | Aluminum                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06944   | Antimony                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06935   | Arsenic                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates      | 1               |
| 06946   | Barium                          | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06947   | Beryllium                       | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06949   | Cadmium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 01650   | Calcium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06951   | Chromium                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II    | 1               |
| 06952   | Cobalt                          | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates      | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SED-3\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-3\_040711

**LLI Sample #** SW 6253881  
**LLI Group #** 1241316  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 11:50 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/08/2011 14:10

West Chester PA 19381

**Reported:** 04/29/2011 13:53

SED-3

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06953   | Copper                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 01654   | Iron                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06955   | Lead                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates   | 1               |
| 01657   | Magnesium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06958   | Manganese                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06961   | Nickel                        | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates   | 1               |
| 01662   | Potassium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06936   | Selenium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates   | 1               |
| 06966   | Silver                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 01667   | Sodium                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06925   | Thallium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:12       | Joanne M Gates   | 1               |
| 06971   | Vanadium                      | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 06972   | Zinc                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:29       | John W Yanzuk II | 1               |
| 00159   | Mercury                       | SW-846 7471A          | 1      | 111015711003 | 04/13/2011 08:53       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B          | 1      | 111015708004 | 04/12/2011 09:58       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest            | SW-846 7471A modified | 1      | 111015711003 | 04/12/2011 10:55       | Denise K Conners | 1               |
| 02079   | TOC Solids/Sludges Combustion | SM20 5310 B modified  | 1      | 11101049531A | 04/12/2011 01:13       | James S Mathiot  | 1               |
| 07103   | Grain Size to 1 um            | ASTM D422             | 1      | 11098710301A | 04/08/2011 22:00       | Luz M Groff      | 1               |
| 00111   | Moisture                      | SM20 2540 G           | 1      | 11103820003A | 04/13/2011 20:31       | Scott W Freisher | 1               |

**Sample Description:** SED-4\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-4\_040711

LLI Sample # SW 6253882  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:55 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-4

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 32           | 7                          | 0.7                        | 0.92            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 7          | 7                          | 1                          | 0.92            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | Ethylbenzene                | 100-41-4            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 7          | 7                          | 1                          | 0.92            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 7          | 7                          | 0.7                        | 0.92            |
| 10950        | Toluene                     | 108-88-3            | 29           | 7                          | 1                          | 0.92            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 7          | 7                          | 1                          | 0.92            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 7          | 7                          | 1                          | 0.92            |
| 10950        | Xylene (Total)              | 1330-20-7           | 15           | 7                          | 1                          | 0.92            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                            |                     |              |              |              |    |
|--------------|----------------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b>       | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10728        | Benzenethiol               | 108-98-5            | < 14,000     | 14,000       | 4,800        | 10 |
| 10728        | Benzo(k)fluoranthene       | 207-08-9            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Butylbenzylphthalate       | 85-68-7             | < 2,400      | 2,400        | 960          | 10 |
| 10728        | Di-n-butylphthalate        | 84-74-2             | < 2,400      | 2,400        | 960          | 10 |
| 10728        | Dibenz(a,h)acridine        | 226-36-8            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Dibenz(a,h)anthracene      | 53-70-3             | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Diethylphthalate           | 84-66-2             | < 2,400      | 2,400        | 960          | 10 |
| 10728        | 2,4-Dimethylphenol         | 105-67-9            | < 2,400      | 2,400        | 960          | 10 |
| 10728        | Dimethylphthalate          | 131-11-3            | < 2,400      | 2,400        | 960          | 10 |
| 10728        | 2,4-Dinitrophenol          | 51-28-5             | < 14,000     | 14,000       | 4,800        | 10 |
| 10728        | bis(2-Ethylhexyl)phthalate | 117-81-7            | < 4,800      | 4,800        | 960          | 10 |
| 10728        | Fluoranthene               | 206-44-0            | < 2,400      | 2,400        | 480          | 10 |
| 10728        | 6-Methylchrysene           | 1705-85-7           | < 2,400      | 2,400        | 480          | 10 |
| 10728        | 2-Methylphenol             | 95-48-7             | < 2,400      | 2,400        | 960          | 10 |
| 10728        | 2-Nitrophenol              | 88-75-5             | < 2,400      | 2,400        | 480          | 10 |
| 10728        | Di-n-octylphthalate        | 117-84-0            | < 2,400      | 2,400        | 960          | 10 |
| 10728        | Phenol                     | 108-95-2            | < 2,400      | 2,400        | 480          | 10 |

Reporting limits were raised due to interference from the sample matrix.

A separate LCS/LCSD for benzenethiol were performed due to the instability of benzenethiol in a spike solution. The MS/MSD associated with this sample was not spiked with benzenethiol.

|              |                      |                         |              |              |              |    |
|--------------|----------------------|-------------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C SIM</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10722        | Anthracene           | 120-12-7                | 150          | 24           | 4.8          | 10 |
| 10722        | Benzo(a)anthracene   | 56-55-3                 | 380          | 24           | 9.6          | 10 |
| 10722        | Benzo(a)pyrene       | 50-32-8                 | 320          | 24           | 9.6          | 10 |
| 10722        | Benzo(b)fluoranthene | 205-99-2                | 420          | 24           | 9.6          | 10 |
| 10722        | Benzo(g,h,i)perylene | 191-24-2                | 210          | 24           | 9.6          | 10 |
| 10722        | Chrysene             | 218-01-9                | 440          | 24           | 4.8          | 10 |
| 10722        | Fluorene             | 86-73-7                 | 46           | 24           | 9.6          | 10 |
| 10722        | 1-Methylnaphthalene  | 90-12-0                 | 290          | 24           | 9.6          | 10 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-4\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-4\_040711

LLI Sample # SW 6253882  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:55 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-4

| CAT No.                                                                                                                                                                                                                                   | Analysis Name                 | CAS Number | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------|------------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS Semivolatiles</b>                                                                                                                                                                                                                | <b>SW-846 8270C SIM</b>       |            | <b>ug/kg</b>     | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10722                                                                                                                                                                                                                                     | Naphthalene                   | 91-20-3    | 530              | 24                         | 9.6                        | 10              |
| 10722                                                                                                                                                                                                                                     | Phenanthrene                  | 85-01-8    | 530              | 24                         | 9.6                        | 10              |
| 10722                                                                                                                                                                                                                                     | Pyrene                        | 129-00-0   | 630              | 24                         | 9.6                        | 10              |
| The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance: |                               |            |                  |                            |                            |                 |
| pyrene                                                                                                                                                                                                                                    |                               |            |                  |                            |                            |                 |
| <b>Metals</b>                                                                                                                                                                                                                             | <b>SW-846 6010B</b>           |            | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643                                                                                                                                                                                                                                     | Aluminum                      | 7429-90-5  | 14,300           | 28.7                       | 7.21                       | 1               |
| 06944                                                                                                                                                                                                                                     | Antimony                      | 7440-36-0  | < 2.87           | 2.87                       | 1.43                       | 1               |
| 06935                                                                                                                                                                                                                                     | Arsenic                       | 7440-38-2  | 21.9             | 2.87                       | 1.36                       | 1               |
| 06946                                                                                                                                                                                                                                     | Barium                        | 7440-39-3  | 96.3             | 0.716                      | 0.0573                     | 1               |
| 06947                                                                                                                                                                                                                                     | Beryllium                     | 7440-41-7  | 0.956            | 0.716                      | 0.0974                     | 1               |
| 06949                                                                                                                                                                                                                                     | Cadmium                       | 7440-43-9  | 1.26             | 0.716                      | 0.201                      | 1               |
| 01650                                                                                                                                                                                                                                     | Calcium                       | 7440-70-2  | 6,660            | 28.7                       | 8.78                       | 1               |
| 06951                                                                                                                                                                                                                                     | Chromium                      | 7440-47-3  | 64.7             | 2.15                       | 0.845                      | 1               |
| 06952                                                                                                                                                                                                                                     | Cobalt                        | 7440-48-4  | 7.98             | 0.716                      | 0.272                      | 1               |
| 06953                                                                                                                                                                                                                                     | Copper                        | 7440-50-8  | 74.4             | 1.43                       | 0.315                      | 1               |
| 01654                                                                                                                                                                                                                                     | Iron                          | 7439-89-6  | 19,400           | 28.7                       | 6.75                       | 1               |
| 06955                                                                                                                                                                                                                                     | Lead                          | 7439-92-1  | 306              | 2.15                       | 0.860                      | 1               |
| 01657                                                                                                                                                                                                                                     | Magnesium                     | 7439-95-4  | 3,870            | 14.3                       | 3.64                       | 1               |
| 06958                                                                                                                                                                                                                                     | Manganese                     | 7439-96-5  | 375              | 0.716                      | 0.112                      | 1               |
| 06961                                                                                                                                                                                                                                     | Nickel                        | 7440-02-0  | 85.6             | 1.43                       | 0.272                      | 1               |
| 01662                                                                                                                                                                                                                                     | Potassium                     | 7440-09-7  | 1,670            | 71.6                       | 25.8                       | 1               |
| 06936                                                                                                                                                                                                                                     | Selenium                      | 7782-49-2  | < 2.87           | 2.87                       | 1.40                       | 1               |
| 06966                                                                                                                                                                                                                                     | Silver                        | 7440-22-4  | 0.855            | 0.716                      | 0.258                      | 1               |
| 01667                                                                                                                                                                                                                                     | Sodium                        | 7440-23-5  | < 143            | 143                        | 53.4                       | 1               |
| 06925                                                                                                                                                                                                                                     | Thallium                      | 7440-28-0  | < 4.30           | 4.30                       | 2.08                       | 1               |
| 06971                                                                                                                                                                                                                                     | Vanadium                      | 7440-62-2  | 71.6             | 0.716                      | 0.272                      | 1               |
| 06972                                                                                                                                                                                                                                     | Zinc                          | 7440-66-6  | 1,710            | 14.3                       | 4.73                       | 5               |
|                                                                                                                                                                                                                                           | <b>SW-846 7471A</b>           |            | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 00159                                                                                                                                                                                                                                     | Mercury                       | 7439-97-6  | 0.288            | 0.140                      | 0.0040                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      | <b>SM20 5310 B modified</b>   |            | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 02079                                                                                                                                                                                                                                     | TOC Solids/Sludges Combustion | n.a.       | 47,800           | 3,400                      | 1,130                      | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      | <b>ASTM D422</b>              |            | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                                                                                                                                                                                                                                     | 75 mm                         | n.a.       | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 37.5 mm                       | n.a.       | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 19 mm                         | n.a.       | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 4.75 mm                       | n.a.       | 72.0             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 3.35 mm                       | n.a.       | 60.6             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 2.36 mm                       | n.a.       | 50.5             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 1.18 mm                       | n.a.       | 37.6             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.6 mm                        | n.a.       | 26.1             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.3 mm                        | n.a.       | 19.8             | 1.0                        | 0.50                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-4\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-4\_040711

LLI Sample # SW 6253882  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:55 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/29/2011 13:53

SED-4

| CAT No.              | Analysis Name | CAS Number       | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|---------------|------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |               | <b>ASTM D422</b> | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                | 0.15 mm       | n.a.             | 16.8             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.075 mm      | n.a.             | 14.9             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.064 mm      | n.a.             | 14.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.05 mm       | n.a.             | 13.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.02 mm       | n.a.             | 9.5              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.005 mm      | n.a.             | 3.5              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.002 mm      | n.a.             | 2.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.001 mm      | n.a.             | 1.0              | 1.0                        | 0.50                       | 1               |

|                                                                                                                                                                       |          |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  |          | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture | n.a.               | 30.9     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                   | Method           | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------------|------------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Iso/TMB/D CBs | SW-846 8260B     | 1      | X111021AA    | 04/12/2011 06:48       | Stephanie A Selis   | 0.92            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC  | SW-846 5035      | 1      | 201109824067 | 04/07/2011 10:55       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 1      | 201109824067 | 04/07/2011 10:55       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 2      | 201109824067 | 04/07/2011 10:55       | Client Supplied     | 1               |
| 10728   | Skinner 8270 (microwave)        | SW-846 8270C     | 1      | 11102SLC026  | 04/15/2011 01:50       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/14/2011 08:09       | Joseph M Gambler    | 10              |
| 10810   | BNA Soil Microwave SIM PAH      | SW-846 3546      | 1      | 11102SLG026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 10812   | BNA Soil Microwave Skinner      | SW-846 3546      | 1      | 11102SLC026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 01643   | Aluminum                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06944   | Antimony                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06935   | Arsenic                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates      | 1               |
| 06946   | Barium                          | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06947   | Beryllium                       | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06949   | Cadmium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 01650   | Calcium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06951   | Chromium                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II    | 1               |
| 06952   | Cobalt                          | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-4\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-4\_040711

LLI Sample # SW 6253882  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:55 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/29/2011 13:53

SED-4

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method                | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|-----------------------|--------|--------------|------------------------|------------------|-----------------|
| 06953   | Copper                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 01654   | Iron                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06955   | Lead                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates   | 1               |
| 01657   | Magnesium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06958   | Manganese                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06961   | Nickel                        | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates   | 1               |
| 01662   | Potassium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06936   | Selenium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates   | 1               |
| 06966   | Silver                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 01667   | Sodium                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06925   | Thallium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:15       | Joanne M Gates   | 1               |
| 06971   | Vanadium                      | SW-846 6010B          | 1      | 111015708004 | 04/13/2011 01:33       | John W Yanzuk II | 1               |
| 06972   | Zinc                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011 14:19       | Joanne M Gates   | 5               |
| 00159   | Mercury                       | SW-846 7471A          | 1      | 111015711003 | 04/13/2011 08:54       | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B          | 1      | 111015708004 | 04/12/2011 09:58       | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest            | SW-846 7471A modified | 1      | 111015711003 | 04/12/2011 10:55       | Denise K Conners | 1               |
| 02079   | TOC Solids/Sludges Combustion | SM20 5310 B modified  | 1      | 11101049531A | 04/12/2011 01:53       | James S Mathiot  | 1               |
| 07103   | Grain Size to 1 um            | ASTM D422             | 1      | 11098710301A | 04/08/2011 22:00       | Luz M Groff      | 1               |
| 00111   | Moisture                      | SM20 2540 G           | 1      | 11103820003A | 04/13/2011 20:31       | Scott W Freisher | 1               |



**Sample Description:** SED-5\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-5\_040711

LLI Sample # SW 6253883  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:10 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-5

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 41           | 9                          | 0.9                        | 1.03            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 9          | 9                          | 2                          | 1.03            |
| 10950        | 1,2-Dichlorobenzene         | 95-50-1             | < 9          | 9                          | 2                          | 1.03            |
| 10950        | 1,3-Dichlorobenzene         | 541-73-1            | < 9          | 9                          | 2                          | 1.03            |
| 10950        | 1,4-Dichlorobenzene         | 106-46-7            | < 9          | 9                          | 2                          | 1.03            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 9          | 9                          | 2                          | 1.03            |
| 10950        | Ethylbenzene                | 100-41-4            | 24           | 9                          | 2                          | 1.03            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 9          | 9                          | 2                          | 1.03            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 9          | 9                          | 0.9                        | 1.03            |
| 10950        | Toluene                     | 108-88-3            | 340          | 9                          | 2                          | 1.03            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 35           | 9                          | 2                          | 1.03            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | 15           | 9                          | 2                          | 1.03            |
| 10950        | Xylene (Total)              | 1330-20-7           | 310          | 9                          | 2                          | 1.03            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                            |                     |              |              |              |    |
|--------------|----------------------------|---------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b>       | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10728        | Benzenethiol               | 108-98-5            | < 17,000     | 17,000       | 5,600        | 10 |
| 10728        | Benzo(k)fluoranthene       | 207-08-9            | < 2,800      | 2,800        | 560          | 10 |
| 10728        | Butylbenzylphthalate       | 85-68-7             | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | Di-n-butylphthalate        | 84-74-2             | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | Dibenz(a,h)acridine        | 226-36-8            | < 2,800      | 2,800        | 560          | 10 |
| 10728        | Dibenz(a,h)anthracene      | 53-70-3             | < 2,800      | 2,800        | 560          | 10 |
| 10728        | Diethylphthalate           | 84-66-2             | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | 2,4-Dimethylphenol         | 105-67-9            | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | Dimethylphthalate          | 131-11-3            | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | 2,4-Dinitrophenol          | 51-28-5             | < 17,000     | 17,000       | 5,600        | 10 |
| 10728        | bis(2-Ethylhexyl)phthalate | 117-81-7            | < 5,600      | 5,600        | 1,100        | 10 |
| 10728        | Fluoranthene               | 206-44-0            | < 2,800      | 2,800        | 560          | 10 |
| 10728        | 6-Methylchrysene           | 1705-85-7           | < 2,800      | 2,800        | 560          | 10 |
| 10728        | 2-Methylphenol             | 95-48-7             | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | 2-Nitrophenol              | 88-75-5             | < 2,800      | 2,800        | 560          | 10 |
| 10728        | Di-n-octylphthalate        | 117-84-0            | < 2,800      | 2,800        | 1,100        | 10 |
| 10728        | Phenol                     | 108-95-2            | < 2,800      | 2,800        | 560          | 10 |

Reporting limits were raised due to interference from the sample matrix.

A separate LCS/LCSD for benzenethiol were performed due to the instability of benzenethiol in a spike solution. The MS/MSD associated with this sample was not spiked with benzenethiol.

|              |                      |                         |              |              |              |    |
|--------------|----------------------|-------------------------|--------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C SIM</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 10722        | Anthracene           | 120-12-7                | 150          | 28           | 5.6          | 10 |
| 10722        | Benzo(a)anthracene   | 56-55-3                 | 280          | 28           | 11           | 10 |
| 10722        | Benzo(a)pyrene       | 50-32-8                 | 250          | 28           | 11           | 10 |
| 10722        | Benzo(b)fluoranthene | 205-99-2                | 380          | 28           | 11           | 10 |
| 10722        | Benzo(g,h,i)perylene | 191-24-2                | 180          | 28           | 11           | 10 |
| 10722        | Chrysene             | 218-01-9                | 350          | 28           | 5.6          | 10 |
| 10722        | Fluorene             | 86-73-7                 | 40           | 28           | 11           | 10 |
| 10722        | 1-Methylnaphthalene  | 90-12-0                 | 180          | 28           | 11           | 10 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-5\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-5\_040711

LLI Sample # SW 6253883  
LLI Group # 1241316  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:10 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/29/2011 13:53

West Chester PA 19381

SED-5

| CAT No.                                                                                                                                                                                                                                   | Analysis Name                 | CAS Number              | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b>                                                                                                                                                                                                                              | <b>Semivolatiles</b>          | <b>SW-846 8270C SIM</b> | <b>ug/kg</b>     | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10722                                                                                                                                                                                                                                     | Naphthalene                   | 91-20-3                 | 680              | 28                         | 11                         | 10              |
| 10722                                                                                                                                                                                                                                     | Phenanthrene                  | 85-01-8                 | 460              | 28                         | 11                         | 10              |
| 10722                                                                                                                                                                                                                                     | Pyrene                        | 129-00-0                | 410              | 28                         | 11                         | 10              |
| The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance: |                               |                         |                  |                            |                            |                 |
| pyrene                                                                                                                                                                                                                                    |                               |                         |                  |                            |                            |                 |
| <b>Metals</b>                                                                                                                                                                                                                             | <b>SW-846 6010B</b>           |                         | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 01643                                                                                                                                                                                                                                     | Aluminum                      | 7429-90-5               | 22,300           | 32.9                       | 8.27                       | 1               |
| 06944                                                                                                                                                                                                                                     | Antimony                      | 7440-36-0               | < 3.29           | 3.29                       | 1.64                       | 1               |
| 06935                                                                                                                                                                                                                                     | Arsenic                       | 7440-38-2               | 14.6             | 3.29                       | 1.56                       | 1               |
| 06946                                                                                                                                                                                                                                     | Barium                        | 7440-39-3               | 225              | 0.822                      | 0.0658                     | 1               |
| 06947                                                                                                                                                                                                                                     | Beryllium                     | 7440-41-7               | 0.936            | 0.822                      | 0.112                      | 1               |
| 06949                                                                                                                                                                                                                                     | Cadmium                       | 7440-43-9               | 1.20             | 0.822                      | 0.230                      | 1               |
| 01650                                                                                                                                                                                                                                     | Calcium                       | 7440-70-2               | 12,600           | 32.9                       | 10.1                       | 1               |
| 06951                                                                                                                                                                                                                                     | Chromium                      | 7440-47-3               | 66.4             | 2.47                       | 0.971                      | 1               |
| 06952                                                                                                                                                                                                                                     | Cobalt                        | 7440-48-4               | 11.5             | 0.822                      | 0.313                      | 1               |
| 06953                                                                                                                                                                                                                                     | Copper                        | 7440-50-8               | 109              | 1.64                       | 0.362                      | 1               |
| 01654                                                                                                                                                                                                                                     | Iron                          | 7439-89-6               | 21,700           | 32.9                       | 7.75                       | 1               |
| 06955                                                                                                                                                                                                                                     | Lead                          | 7439-92-1               | 319              | 2.47                       | 0.987                      | 1               |
| 01657                                                                                                                                                                                                                                     | Magnesium                     | 7439-95-4               | 7,190            | 16.4                       | 4.18                       | 1               |
| 06958                                                                                                                                                                                                                                     | Manganese                     | 7439-96-5               | 508              | 0.822                      | 0.128                      | 1               |
| 06961                                                                                                                                                                                                                                     | Nickel                        | 7440-02-0               | 44.1             | 1.64                       | 0.313                      | 1               |
| 01662                                                                                                                                                                                                                                     | Potassium                     | 7440-09-7               | 1,530            | 82.2                       | 29.6                       | 1               |
| 06936                                                                                                                                                                                                                                     | Selenium                      | 7782-49-2               | < 3.29           | 3.29                       | 1.61                       | 1               |
| 06966                                                                                                                                                                                                                                     | Silver                        | 7440-22-4               | 1.11             | 0.822                      | 0.296                      | 1               |
| 01667                                                                                                                                                                                                                                     | Sodium                        | 7440-23-5               | 188              | 164                        | 61.4                       | 1               |
| 06925                                                                                                                                                                                                                                     | Thallium                      | 7440-28-0               | < 4.93           | 4.93                       | 2.39                       | 1               |
| 06971                                                                                                                                                                                                                                     | Vanadium                      | 7440-62-2               | 94.7             | 0.822                      | 0.313                      | 1               |
| 06972                                                                                                                                                                                                                                     | Zinc                          | 7440-66-6               | 339              | 3.29                       | 1.09                       | 1               |
|                                                                                                                                                                                                                                           | <b>SW-846 7471A</b>           |                         | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 00159                                                                                                                                                                                                                                     | Mercury                       | 7439-97-6               | 0.524            | 0.156                      | 0.0045                     | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      | <b>SM20 5310 B modified</b>   |                         | <b>mg/kg</b>     | <b>mg/kg</b>               | <b>mg/kg</b>               |                 |
| 02079                                                                                                                                                                                                                                     | TOC Solids/Sludges Combustion | n.a.                    | 59,900           | 6,360                      | 2,120                      | 1               |
| <b>Wet Chemistry</b>                                                                                                                                                                                                                      | <b>ASTM D422</b>              |                         | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                                                                                                                                                                                                                                     | 75 mm                         | n.a.                    | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 37.5 mm                       | n.a.                    | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 19 mm                         | n.a.                    | 100              | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 4.75 mm                       | n.a.                    | 95.0             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 3.35 mm                       | n.a.                    | 91.1             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 2.36 mm                       | n.a.                    | 84.9             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 1.18 mm                       | n.a.                    | 80.9             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.6 mm                        | n.a.                    | 78.3             | 1.0                        | 0.50                       | 1               |
| 07103                                                                                                                                                                                                                                     | 0.3 mm                        | n.a.                    | 75.1             | 1.0                        | 0.50                       | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-5\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-5\_040711

**LLI Sample #** SW 6253883  
**LLI Group #** 1241316  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 10:10 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

**Submitted:** 04/08/2011 14:10

**Reported:** 04/29/2011 13:53

SED-5

| CAT No.              | Analysis Name | CAS Number       | Dry Result       | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|----------------------|---------------|------------------|------------------|----------------------------|----------------------------|-----------------|
| <b>Wet Chemistry</b> |               | <b>ASTM D422</b> | <b>% Passing</b> | <b>% Passing</b>           | <b>% Passing</b>           |                 |
| 07103                | 0.15 mm       | n.a.             | 67.9             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.075 mm      | n.a.             | 53.9             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.064 mm      | n.a.             | 48.5             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.05 mm       | n.a.             | 38.0             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.02 mm       | n.a.             | 22.5             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.005 mm      | n.a.             | 12.5             | 1.0                        | 0.50                       | 1               |
| 07103                | 0.002 mm      | n.a.             | 8.0              | 1.0                        | 0.50                       | 1               |
| 07103                | 0.001 mm      | n.a.             | 2.0              | 1.0                        | 0.50                       | 1               |

|                                                                                                                                                                       |          |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  |          | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture | n.a.               | 40.4     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                   | Method           | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|---------------------------------|------------------|--------|--------------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Iso/TMB/D CBs | SW-846 8260B     | 1      | X111021AA    | 04/12/2011 07:11       | Stephanie A Selis   | 1.03            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC  | SW-846 5035      | 1      | 201109824067 | 04/07/2011 10:10       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 1      | 201109824067 | 04/07/2011 10:10       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate   | SW-846 5035      | 2      | 201109824067 | 04/07/2011 10:10       | Client Supplied     | 1               |
| 10728   | Skinner 8270 (microwave)        | SW-846 8270C     | 1      | 11102SLC026  | 04/15/2011 02:16       | Gregory J Drahovsky | 10              |
| 10722   | SIM PAH 8270 (microwave)        | SW-846 8270C SIM | 1      | 11102SLG026  | 04/14/2011 08:41       | Joseph M Gambler    | 10              |
| 10810   | BNA Soil Microwave SIM PAH      | SW-846 3546      | 1      | 11102SLG026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 10812   | BNA Soil Microwave Skinner      | SW-846 3546      | 1      | 11102SLC026  | 04/13/2011 08:00       | Kerrie A Freeburn   | 1               |
| 01643   | Aluminum                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06944   | Antimony                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06935   | Arsenic                         | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:22       | Joanne M Gates      | 1               |
| 06946   | Barium                          | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06947   | Beryllium                       | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06949   | Cadmium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 01650   | Calcium                         | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06951   | Chromium                        | SW-846 6010B     | 1      | 111015708004 | 04/13/2011 01:36       | John W Yanzuk II    | 1               |
| 06952   | Cobalt                          | SW-846 6010B     | 1      | 111015708004 | 04/14/2011 14:22       | Joanne M Gates      | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SED-5\_040711 Grab Soil  
Philadelphia Refinery AOI-10  
COC: 258845 SED-5\_040711

**LLI Sample #** SW 6253883  
**LLI Group #** 1241316  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 10:10 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/08/2011 14:10

West Chester PA 19381

**Reported:** 04/29/2011 13:53

SED-5

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method                | Trial# | Batch#       | Analysis Date and Time |       | Analyst          | Dilution Factor |
|---------|-------------------------------|-----------------------|--------|--------------|------------------------|-------|------------------|-----------------|
|         |                               |                       |        |              |                        |       |                  |                 |
| 06953   | Copper                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 01654   | Iron                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06955   | Lead                          | SW-846 6010B          | 1      | 111015708004 | 04/14/2011             | 14:22 | Joanne M Gates   | 1               |
| 01657   | Magnesium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06958   | Manganese                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06961   | Nickel                        | SW-846 6010B          | 1      | 111015708004 | 04/14/2011             | 14:22 | Joanne M Gates   | 1               |
| 01662   | Potassium                     | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06936   | Selenium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011             | 14:22 | Joanne M Gates   | 1               |
| 06966   | Silver                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 01667   | Sodium                        | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06925   | Thallium                      | SW-846 6010B          | 1      | 111015708004 | 04/14/2011             | 14:22 | Joanne M Gates   | 1               |
| 06971   | Vanadium                      | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 06972   | Zinc                          | SW-846 6010B          | 1      | 111015708004 | 04/13/2011             | 01:36 | John W Yanzuk II | 1               |
| 00159   | Mercury                       | SW-846 7471A          | 1      | 111015711003 | 04/13/2011             | 08:55 | Damary Valentin  | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B          | 1      | 111015708004 | 04/12/2011             | 09:58 | Denise K Conners | 1               |
| 05711   | SW SW846 Hg Digest            | SW-846 7471A modified | 1      | 111015711003 | 04/12/2011             | 10:55 | Denise K Conners | 1               |
| 02079   | TOC Solids/Sludges Combustion | SM20 5310 B modified  | 1      | 11101049531A | 04/12/2011             | 02:38 | James S Mathiot  | 1               |
| 07103   | Grain Size to 1 um            | ASTM D422             | 1      | 11098710301A | 04/08/2011             | 22:00 | Luz M Groff      | 1               |
| 00111   | Moisture                      | SM20 2540 G           | 1      | 11103820003A | 04/13/2011             | 20:31 | Scott W Freisher | 1               |

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/29/11 at 01:53 PM

Group Number: 1241316

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                               | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-------------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: X111021AA Sample number(s): 6253879-6253883   |              |             |           |              |          |           |                 |     |         |
| Benzene                                                     | < 5          | 5.          | 0.5       | ug/kg        | 100      | 98        | 80-120          | 3   | 30      |
| 1,2-Dibromoethane                                           | < 5          | 5.          | 1         | ug/kg        | 89       | 100       | 80-120          | 12  | 30      |
| 1,2-Dichlorobenzene                                         | < 5          | 5.          | 1         | ug/kg        | 92       | 94        | 79-120          | 3   | 30      |
| 1,3-Dichlorobenzene                                         | < 5          | 5.          | 1         | ug/kg        | 91       | 90        | 78-120          | 1   | 30      |
| 1,4-Dichlorobenzene                                         | < 5          | 5.          | 1         | ug/kg        | 91       | 90        | 79-120          | 1   | 30      |
| 1,2-Dichloroethane                                          | < 5          | 5.          | 1         | ug/kg        | 92       | 94        | 71-129          | 2   | 30      |
| Ethylbenzene                                                | < 5          | 5.          | 1         | ug/kg        | 99       | 97        | 80-120          | 2   | 30      |
| Isopropylbenzene                                            | < 5          | 5.          | 1         | ug/kg        | 98       | 96        | 76-120          | 3   | 30      |
| Methyl Tertiary Butyl Ether                                 | < 5          | 5.          | 0.5       | ug/kg        | 82       | 90        | 74-121          | 9   | 30      |
| Toluene                                                     | < 5          | 5.          | 1         | ug/kg        | 101      | 99        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                                      | < 5          | 5.          | 1         | ug/kg        | 103      | 101       | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene                                      | < 5          | 5.          | 1         | ug/kg        | 105      | 103       | 78-120          | 2   | 30      |
| Xylene (Total)                                              | < 5          | 5.          | 1         | ug/kg        | 98       | 97        | 80-120          | 1   | 30      |
| Batch number: 11102SLC026 Sample number(s): 6253879-6253883 |              |             |           |              |          |           |                 |     |         |
| Benzenethiol                                                | < 1,000      | 1,000.      | 330       | ug/kg        | 78       | 74        | 43-123          | 5   | 30      |
| Benzo(k) fluoranthene                                       | < 170        | 170.        | 33        | ug/kg        | 104      |           | 71-135          |     |         |
| Butylbenzylphthalate                                        | < 170        | 170.        | 67        | ug/kg        | 101      |           | 83-122          |     |         |
| Di-n-butylphthalate                                         | < 170        | 170.        | 67        | ug/kg        | 92       |           | 79-112          |     |         |
| Dibenz(a,h)acridine                                         | < 170        | 170.        | 33        | ug/kg        | 110      |           | 72-122          |     |         |
| Dibenz(a,h)anthracene                                       | < 170        | 170.        | 33        | ug/kg        | 107      |           | 67-129          |     |         |
| Diethylphthalate                                            | < 170        | 170.        | 67        | ug/kg        | 100      |           | 82-113          |     |         |
| 2,4-Dimethylphenol                                          | < 170        | 170.        | 67        | ug/kg        | 104      |           | 83-120          |     |         |
| Dimethylphthalate                                           | < 170        | 170.        | 67        | ug/kg        | 102      |           | 85-111          |     |         |
| 2,4-Dinitrophenol                                           | < 1,000      | 1,000.      | 330       | ug/kg        | 87       |           | 51-124          |     |         |
| bis(2-Ethylhexyl)phthalate                                  | < 330        | 330.        | 67        | ug/kg        | 96       |           | 80-119          |     |         |
| Fluoranthene                                                | < 170        | 170.        | 33        | ug/kg        | 96       |           | 80-113          |     |         |
| 6-Methylchrysene                                            | < 170        | 170.        | 33        | ug/kg        | 99       |           | 77-110          |     |         |
| 2-Methylphenol                                              | < 170        | 170.        | 67        | ug/kg        | 91       |           | 80-119          |     |         |
| 2-Nitrophenol                                               | < 170        | 170.        | 33        | ug/kg        | 100      |           | 81-114          |     |         |
| Di-n-octylphthalate                                         | < 170        | 170.        | 67        | ug/kg        | 105      |           | 65-141          |     |         |
| Phenol                                                      | < 170        | 170.        | 33        | ug/kg        | 82       |           | 74-115          |     |         |
| Batch number: 11102SLG026 Sample number(s): 6253879-6253883 |              |             |           |              |          |           |                 |     |         |
| Anthracene                                                  | < 1.7        | 1.7         | 0.33      | ug/kg        | 106      |           | 69-107          |     |         |
| Benzo(a)anthracene                                          | < 1.7        | 1.7         | 0.67      | ug/kg        | 98       |           | 74-112          |     |         |
| Benzo(a)pyrene                                              | < 1.7        | 1.7         | 0.67      | ug/kg        | 79       |           | 70-109          |     |         |
| Benzo(b)fluoranthene                                        | < 1.7        | 1.7         | 0.67      | ug/kg        | 78       |           | 60-126          |     |         |
| Benzo(g,h,i)perylene                                        | < 1.7        | 1.7         | 0.67      | ug/kg        | 85       |           | 49-135          |     |         |
| Chrysene                                                    | < 1.7        | 1.7         | 0.33      | ug/kg        | 99       |           | 79-111          |     |         |
| Fluorene                                                    | < 1.7        | 1.7         | 0.67      | ug/kg        | 98       |           | 75-110          |     |         |
| 1-Methylnaphthalene                                         | < 1.7        | 1.7         | 0.67      | ug/kg        | 97       |           | 72-114          |     |         |
| Naphthalene                                                 | < 1.7        | 1.7         | 0.67      | ug/kg        | 96       |           | 67-105          |     |         |
| Phenanthrene                                                | < 1.7        | 1.7         | 0.67      | ug/kg        | 95       |           | 76-109          |     |         |
| Pyrene                                                      | < 1.7        | 1.7         | 0.67      | ug/kg        | 112*     |           | 71-109          |     |         |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/29/11 at 01:53 PM

Group Number: 1241316

| <u>Analysis Name</u>          | <u>Blank Result</u>               | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-------------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Batch number: 111015708004    | Sample number(s): 6253879-6253883 |                    |                  |                     |                 |                  |                        |            |                |
| Aluminum                      | < 19.8                            | 19.8               | 4.98             | mg/kg               | 107             |                  | 61-110                 |            |                |
| Antimony                      | < 1.98                            | 1.98               | 0.990            | mg/kg               | 63              |                  | 38-150                 |            |                |
| Arsenic                       | < 1.98                            | 1.98               | 0.941            | mg/kg               | 96              |                  | 90-110                 |            |                |
| Barium                        | < 0.495                           | 0.495              | 0.0396           | mg/kg               | 109             |                  | 90-117                 |            |                |
| Beryllium                     | < 0.495                           | 0.495              | 0.0673           | mg/kg               | 100             |                  | 87-110                 |            |                |
| Cadmium                       | < 0.495                           | 0.495              | 0.139            | mg/kg               | 112             |                  | 90-114                 |            |                |
| Calcium                       | < 19.8                            | 19.8               | 6.07             | mg/kg               | 103             |                  | 88-110                 |            |                |
| Chromium                      | < 1.49                            | 1.49               | 0.584            | mg/kg               | 103             |                  | 85-110                 |            |                |
| Cobalt                        | < 0.495                           | 0.495              | 0.188            | mg/kg               | 98              |                  | 90-114                 |            |                |
| Copper                        | < 0.990                           | 0.990              | 0.218            | mg/kg               | 105             |                  | 83-112                 |            |                |
| Iron                          | < 19.8                            | 19.8               | 4.66             | mg/kg               | 100             |                  | 61-110                 |            |                |
| Lead                          | < 1.49                            | 1.49               | 0.594            | mg/kg               | 94              |                  | 80-120                 |            |                |
| Magnesium                     | < 9.90                            | 9.90               | 2.51             | mg/kg               | 105             |                  | 82-110                 |            |                |
| Manganese                     | < 0.495                           | 0.495              | 0.0772           | mg/kg               | 103             |                  | 89-112                 |            |                |
| Nickel                        | < 0.990                           | 0.990              | 0.188            | mg/kg               | 98              |                  | 90-114                 |            |                |
| Potassium                     | < 49.5                            | 49.5               | 17.8             | mg/kg               | 105             |                  | 78-110                 |            |                |
| Selenium                      | < 1.98                            | 1.98               | 0.970            | mg/kg               | 94              |                  | 57-110                 |            |                |
| Silver                        | < 0.495                           | 0.495              | 0.178            | mg/kg               | 106             |                  | 86-111                 |            |                |
| Sodium                        | < 99.0                            | 99.0               | 36.9             | mg/kg               | 104             |                  | 87-110                 |            |                |
| Thallium                      | < 2.97                            | 2.97               | 1.44             | mg/kg               | 101             |                  | 90-116                 |            |                |
| Vanadium                      | < 0.495                           | 0.495              | 0.188            | mg/kg               | 100             |                  | 79-110                 |            |                |
| Zinc                          | < 1.98                            | 1.98               | 0.653            | mg/kg               | 109             |                  | 90-110                 |            |                |
| Batch number: 111015711003    | Sample number(s): 6253879-6253883 |                    |                  |                     |                 |                  |                        |            |                |
| Mercury                       | < 0.0960                          | 0.0960             | 0.0028           | mg/kg               | 94              |                  | 88-123                 |            |                |
| Batch number: 11101049531A    | Sample number(s): 6253879-6253883 |                    |                  |                     |                 |                  |                        |            |                |
| TOC Solids/Sludges Combustion | < 300                             | 300.               | 100              | mg/kg               | 55              |                  | 35-144                 |            |                |
| Batch number: 11103820003A    | Sample number(s): 6253879-6253883 |                    |                  |                     |                 |                  |                        |            |                |
| Moisture                      |                                   |                    |                  |                     | 100             |                  | 99-101                 |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>       | <u>MS %REC</u>                                   | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|----------------------------|--------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: 11102SLC026  | Sample number(s): 6253879-6253883 UNSPK: 6253879 |                 |                      |            |                |                 |                 |                |                    |
| Benzo(k)fluoranthene       | 74                                               | 65              | 61-131               | 13         | 30             |                 |                 |                |                    |
| Butylbenzylphthalate       | 119                                              | 100             | 42-155               | 17         | 30             |                 |                 |                |                    |
| Di-n-butylphthalate        | 73                                               | 59              | 55-131               | 20         | 30             |                 |                 |                |                    |
| Dibenz(a,h)acridine        | 70                                               | 67              | 10-159               | 4          | 30             |                 |                 |                |                    |
| Dibenz(a,h)anthracene      | 90                                               | 84              | 37-151               | 7          | 30             |                 |                 |                |                    |
| Diethylphthalate           | 71                                               | 66              | 52-130               | 8          | 30             |                 |                 |                |                    |
| 2,4-Dimethylphenol         | 86                                               | 78              | 27-143               | 10         | 30             |                 |                 |                |                    |
| Dimethylphthalate          | 68                                               | 58              | 49-134               | 15         | 30             |                 |                 |                |                    |
| 2,4-Dinitrophenol          | 0*                                               | 0*              | 20-143               | 0          | 30             |                 |                 |                |                    |
| bis(2-Ethylhexyl)phthalate | 103                                              | 92              | 38-151               | 12         | 30             |                 |                 |                |                    |
| Fluoranthene               | 71                                               | 67              | 48-122               | 6          | 30             |                 |                 |                |                    |
| 6-Methylchrysene           | 79                                               | 75              | 11-167               | 5          | 30             |                 |                 |                |                    |
| 2-Methylphenol             | 74                                               | 73              | 30-145               | 0          | 30             |                 |                 |                |                    |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/29/11 at 01:53 PM

Group Number: 1241316

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>                                                                                | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>RPD</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |    |
|-----------------------------------------------------------------------------------------------------|--------------------------|---------------------------|--------------------------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|----|
| 2-Nitrophenol                                                                                       | 63                       | 58                        | 25-151                         | 8                        | 30                        |                           |                          |                              |    |
| Di-n-octylphthalate                                                                                 | 92                       | 77                        | 43-149                         | 18                       | 30                        |                           |                          |                              |    |
| Phenol                                                                                              | 69                       | 72                        | 39-151                         | 5                        | 30                        |                           |                          |                              |    |
| Batch number: 11102SLG026      Sample number(s): 6253879-6253883    UNSPK: P250513                  |                          |                           |                                |                          |                           |                           |                          |                              |    |
| Anthracene                                                                                          | 107                      | 99                        | 56-121                         | 8                        | 30                        |                           |                          |                              |    |
| Benzo(a)anthracene                                                                                  | 104                      | 94                        | 66-114                         | 9                        | 30                        |                           |                          |                              |    |
| Benzo(a)pyrene                                                                                      | 83                       | 74                        | 57-117                         | 10                       | 30                        |                           |                          |                              |    |
| Benzo(b)fluoranthene                                                                                | 89                       | 71                        | 26-142                         | 20                       | 30                        |                           |                          |                              |    |
| Benzo(g,h,i)perylene                                                                                | 87                       | 78                        | 33-141                         | 10                       | 30                        |                           |                          |                              |    |
| Chrysene                                                                                            | 102                      | 92                        | 41-126                         | 9                        | 30                        |                           |                          |                              |    |
| Fluorene                                                                                            | 96                       | 91                        | 65-116                         | 5                        | 30                        |                           |                          |                              |    |
| 1-Methylnaphthalene                                                                                 | 97                       | 95                        | 50-118                         | 1                        | 30                        |                           |                          |                              |    |
| Naphthalene                                                                                         | 104                      | 107                       | 61-113                         | 3                        | 30                        |                           |                          |                              |    |
| Phenanthrene                                                                                        | 99                       | 88                        | 37-134                         | 10                       | 30                        |                           |                          |                              |    |
| Pyrene                                                                                              | 121*                     | 104                       | 31-120                         | 14                       | 30                        |                           |                          |                              |    |
| Batch number: 111015708004      Sample number(s): 6253879-6253883    UNSPK: P252480    BKG: P252480 |                          |                           |                                |                          |                           |                           |                          |                              |    |
| Aluminum                                                                                            | 1324<br>(2)              | 1667<br>(2)               | 90-110                         | 5                        | 20                        | 9,090                     | 8,630                    | 5                            | 20 |
| Antimony                                                                                            | 78                       | 70*                       | 75-125                         | 10                       | 20                        | < 2.00                    | < 2.00                   | 17 (1)                       | 20 |
| Arsenic                                                                                             | 102                      | 97                        | 75-125                         | 4                        | 20                        | 3.98                      | 3.66                     | 8 (1)                        | 20 |
| Barium                                                                                              | 107                      | 103                       | 75-125                         | 4                        | 20                        | 41.2                      | 41.5                     | 1                            | 20 |
| Beryllium                                                                                           | 101                      | 101                       | 83-111                         | 1                        | 20                        | < 0.500                   | < 0.500                  | 8 (1)                        | 20 |
| Cadmium                                                                                             | 108                      | 104                       | 75-125                         | 4                        | 20                        | < 0.500                   | < 0.500                  | 20 (1)                       | 20 |
| Calcium                                                                                             | 1002*                    | 92                        | 75-125                         | 117*                     | 20                        | 926                       | 3,100                    | 108*                         | 20 |
| Chromium                                                                                            | 75                       | 66*                       | 75-125                         | 3                        | 20                        | 43.1                      | 38.0                     | 13                           | 20 |
| Cobalt                                                                                              | 98                       | 99                        | 78-113                         | 0                        | 20                        | 4.25                      | 2.93                     | 37*                          | 20 |
| Copper                                                                                              | 102                      | 100                       | 75-125                         | 2                        | 20                        | 15.1                      | 16.8                     | 11                           | 20 |
| Iron                                                                                                | -631<br>(2)              | -932<br>(2)               | 75-125                         | 4                        | 20                        | 8,710                     | 7,760                    | 12                           | 20 |
| Lead                                                                                                | -65 (2)                  | -219<br>(2)               | 75-125                         | 17                       | 20                        | 151                       | 189                      | 22*                          | 20 |
| Magnesium                                                                                           | -256<br>(2)              | -1271<br>(2)              | 75-125                         | 55*                      | 20                        | 5,110                     | 4,100                    | 22*                          | 20 |
| Manganese                                                                                           | 70*                      | 92                        | 75-125                         | 11                       | 20                        | 54.9                      | 41.9                     | 27*                          | 20 |
| Nickel                                                                                              | 44*                      | 58*                       | 75-125                         | 8                        | 20                        | 56.6                      | 31.5                     | 57*                          | 20 |
| Potassium                                                                                           | 136*                     | 135*                      | 75-125                         | 1                        | 20                        | 1,300                     | 1,260                    | 3                            | 20 |
| Selenium                                                                                            | 100                      | 95                        | 75-125                         | 6                        | 20                        | < 2.00                    | < 2.00                   | 200* (1)                     | 20 |
| Silver                                                                                              | 108                      | 108                       | 75-125                         | 1                        | 20                        | < 0.500                   | < 0.500                  | 17 (1)                       | 20 |
| Sodium                                                                                              | 108                      | 106                       | 75-125                         | 3                        | 20                        | < 100                     | < 100                    | 0 (1)                        | 20 |
| Thallium                                                                                            | 105                      | 106                       | 75-125                         | 1                        | 20                        | < 3.00                    | < 3.00                   | 0 (1)                        | 20 |
| Vanadium                                                                                            | 106                      | 108                       | 75-125                         | 0                        | 20                        | 18.9                      | 18.3                     | 3                            | 20 |
| Zinc                                                                                                | 107                      | 101                       | 75-125                         | 5                        | 20                        | 22.1                      | 23.5                     | 6                            | 20 |
| Batch number: 111015711003      Sample number(s): 6253879-6253883    UNSPK: P252480    BKG: P252480 |                          |                           |                                |                          |                           |                           |                          |                              |    |
| Mercury                                                                                             | 274*                     | 130*                      | 80-120                         | 38*                      | 20                        | 0.272                     | 0.449                    | 49* (1)                      | 20 |
| Batch number: 11101049531A      Sample number(s): 6253879-6253883    UNSPK: P248979    BKG: P248979 |                          |                           |                                |                          |                           |                           |                          |                              |    |
| TOC Solids/Sludges Combustion                                                                       | 71                       |                           | 32-142                         |                          |                           | 7,020                     | 7,240                    | 3                            | 13 |
| Batch number: 11103820003A      Sample number(s): 6253879-6253883    BKG: P253875                   |                          |                           |                                |                          |                           |                           |                          |                              |    |
| Moisture                                                                                            |                          |                           |                                |                          |                           | 17.8                      | 17.6                     | 1                            | 15 |

\*- Outside of specification

\*\*.-This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/29/11 at 01:53 PM

Group Number: 1241316

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | MS<br>%REC | MSD<br>%REC | MS/MSD<br>Limits | RPD | RPD<br>MAX | BKG<br>Conc | DUP<br>Conc | DUP<br>RPD | Dup RPD<br>Max |
|---------------|------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|
|---------------|------------|-------------|------------------|-----|------------|-------------|-------------|------------|----------------|

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111021AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6253879 | 92                   | 95                    | 109        | 90                   |
| 6253880 | 87                   | 105                   | 108        | 88                   |
| 6253881 | 97                   | 103                   | 117        | 85                   |
| 6253882 | 104                  | 109                   | 118        | 85                   |
| 6253883 | 93                   | 99                    | 124*       | 82                   |
| Blank   | 96                   | 101                   | 98         | 101                  |
| LCS     | 92                   | 100                   | 109        | 103                  |
| LCSD    | 93                   | 102                   | 109        | 104                  |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: Skinner 8270 (microwave)

Batch number: 11102SLC026

|         | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------|----------------|----------------------|-----------------|------------------|---------------|
| 6253879 | 72        | 72             | 73                   | 78              | 79               | 79            |
| 6253880 | 81        | 80             | 86                   | 86              | 87               | 96            |
| 6253881 | 68        | 67             | 62                   | 69              | 67               | 65            |
| 6253882 | 70        | 72             | 72                   | 64              | 85               | 78            |
| 6253883 | 82        | 71             | 59                   | 70              | 75               | 82            |
| Blank   | 96        | 105            | 129                  | 100             | 109              | 106           |
| LCS     | 101       | 107            | 119                  | 99              | 102              | 100           |
| LCSD    | 104       | 110            | 123                  | 87              | 95               | 105           |
| MS      | 58        | 60             | 61                   | 62              | 59               | 74            |
| MSD     | 58        | 59             | 57                   | 62              | 62               | 63            |

Limits: 42-130 39-136 28-139 55-121 56-121 43-124

Analysis Name: SIM PAH 8270 (microwave)

Batch number: 11102SLG026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6253879 | 85              | 56               | 92            |
| 6253880 | 79              | 69               | 67            |
| 6253881 | 82              | 74               | 178*          |
| 6253882 | 93              | 79               | 85            |
| 6253883 | 84              | 72               | 72            |
| Blank   | 105             | 107              | 123           |
| LCS     | 101             | 101              | 117           |
| MS      | 121             | 98               | 111           |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/29/11 at 01:53 PM

Group Number: 1241316

### Surrogate Quality Control

|         |        |        |        |
|---------|--------|--------|--------|
| MSD     | 125    | 92     | 103    |
| Limits: | 53-152 | 52-132 | 51-141 |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.



**Lancaster  
Laboratories**

Acct. # 10132 Group# 1241316 Sample # 6253879-83 **COC #** 258845

Please print. Instructions on reverse side correspond with circled numbers. 0,8 -5,2<sup>9</sup>

[illegible]



10132/1241316/6253879-83

0.8-5.2%

**Table 1d**  
**Constituents of Concern for Sediment Samples**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>VOLATILE ORGANIC COMPOUNDS</b>                               | <b>CAS No.</b> |
|-----------------------------------------------------------------|----------------|
| 1,2-Dichloroethane                                              | 107-06-2       |
| 1,2,4-Trimethylbenzene                                          | 95-63-6        |
| 1,3,5-Trimethylbenzene                                          | 108-67-8       |
| Benzene                                                         | 71-43-2        |
| Cumene                                                          | 98-82-8        |
| Ethylbenzene                                                    | 100-41-4       |
| Ethylene dibromide                                              | 106-93-4       |
| Methyl tertiary butyl ether                                     | 1634-04-4      |
| Toluene                                                         | 108-88-3       |
| Xylenes (total)                                                 | 1330-20-7      |
| <b>Additional Volatile Compounds To Be Analyzed<sup>2</sup></b> |                |
| 1,2-Dichlorobenzene                                             | 95-50-1        |
| 1,3-Dichlorobenzene                                             | 541-73-1       |
| 1,4-Dichlorobenzene                                             | 106-46-7       |
| 1-Methylnaphthalene                                             | 90-12-0        |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS (via SIMS Method)</b>             | <b>CAS No.</b> |
|----------------------------------------------------------------------|----------------|
| Anthracene                                                           | 120-12-7       |
| Benzo(a)anthracene                                                   | 56-55-3        |
| Benzo (g,h,i) perylene                                               | 191-24-2       |
| Benzo(a)pyrene                                                       | 50-32-8        |
| Benzo(b)fluoranthene                                                 | 205-99-2       |
| Chrysene                                                             | 218-01-9       |
| Fluorene                                                             | 86-73-7        |
| Naphthalene                                                          | 91-20-3        |
| Phenanthrene                                                         | 85-01-8        |
| Pyrene                                                               | 129-00-0       |
| <b>Additional Semi-Volatile Compounds To Be Analyzed<sup>2</sup></b> |                |
| Phenol                                                               | 108-95-2       |
| 2,4-Dimethylphenol                                                   | 105-67-9       |
| 2,4-Dinitrophenol                                                    | 51-28-5        |
| 2-Methylphenol                                                       | 95-48-7        |
| 6-Methyl Chrysene                                                    | 1705-85-7      |
| 2-Nitrophenol                                                        | 88-75-5        |
| Benzenethiol                                                         | 108-98-5       |
| Dibenz(a,h)acridine                                                  | 224-53-3       |
| Benzo(k)fluoranthene                                                 | 207-08-9       |
| Benzyl Butyl Phthalate                                               | 85-68-7        |
| bis(2-Ethylhexyl) phthalate                                          | 117-81-7       |
| Dibenzo(a,h)anthracene                                               | 53-70-3        |
| Diethyl Phthalate                                                    | 84-66-2        |
| Dimethyl Phthalate                                                   | 131-11-3       |
| Di-n-butyl phthalate                                                 | 84-74-2        |
| Di-n-octyl phthalate                                                 | 117-84-0       |
| Fluoranthene                                                         | 206-44-0       |

**Notes:**

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.

2. Additional compounds to be analyzed obtained from a modified analyte list from the 1992 RCRA RFI.

10132/1241316/6253879-83  
0.8-5.2%

**Table 1d (continued)**  
**Constituents of Concern for Sediment Samples**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| TAL METALS                 | CAS No.   |
|----------------------------|-----------|
| Aluminum                   | 7429-90-5 |
| Antimony                   | 7440-36-0 |
| Arsenic                    | 7440-38-2 |
| Barium                     | 7440-39-3 |
| Beryllium                  | 7440-41-7 |
| Cadmium                    | 7440-43-9 |
| Calcium                    | 7440-70-2 |
| Chromium                   | 7440-47-3 |
| Cobalt                     | 7440-48-4 |
| Copper                     | 7440-50-8 |
| Iron                       | 7439-89-6 |
| Lead (total)               | 7439-92-1 |
| Magnesium                  | 7439-95-4 |
| Manganese                  | 7439-96-5 |
| Mercury                    | 7439-97-6 |
| Nickel                     | 7440-02-0 |
| Potassium                  | 9777-7440 |
| Selenium                   | 7782-49-2 |
| Silver                     | 7440-22-4 |
| Sodium                     | 7440-23-5 |
| Thallium                   | 7440-28-0 |
| Vanadium                   | 7440-62-2 |
| Zinc                       | 7440-66-6 |
| <b>Additional Analysis</b> |           |
| Total Organic Carbon       |           |
| Particle Grain Size        |           |

**Notes:**

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

| Organic Qualifiers |                                                                           | Inorganic Qualifiers |                                                         |
|--------------------|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------|
| <b>A</b>           | TIC is a possible aldol-condensation product                              | <b>B</b>             | Value is $<$ CRDL, but $\geq$ IDL                       |
| <b>B</b>           | Analyte was also detected in the blank                                    | <b>E</b>             | Estimated due to interference                           |
| <b>C</b>           | Pesticide result confirmed by GC/MS                                       | <b>M</b>             | Duplicate injection precision not met                   |
| <b>D</b>           | Compound quantitated on a diluted sample                                  | <b>N</b>             | Spike sample not within control limits                  |
| <b>E</b>           | Concentration exceeds the calibration range of the instrument             | <b>S</b>             | Method of standard additions (MSA) used for calculation |
| <b>N</b>           | Presumptive evidence of a compound (TICs only)                            | <b>U</b>             | Compound was not detected                               |
| <b>P</b>           | Concentration difference between primary and confirmation columns $>25\%$ | <b>W</b>             | Post digestion spike out of control limits              |
| <b>U</b>           | Compound was not detected                                                 | <b>*</b>             | Duplicate analysis not within control limits            |
| <b>X,Y,Z</b>       | Defined in case narrative                                                 | <b>+</b>             | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 19, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/08/2011  
Group Number: 1241314  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionSWS-1\_040711 Grab Water  
SWS-1\_040711 Filtered Grab Water  
SWS-2\_040711 Grab Water  
SWS-2\_040711 Filtered Grab Water  
SWS-3\_040711 Grab Water  
SWS-3\_040711 Filtered Grab Water  
SWS-4\_040711 Grab Water  
SWS-4\_040711 Filtered Grab Water  
SWS-5\_040711 Grab Water  
SWS-5\_040711 Filtered Grab WaterLancaster Labs (LLI) #6253864  
6253865  
6253866  
6253867  
6253868  
6253869  
6253870  
6253871  
6253872  
6253873

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC      Langan  
COPY TO

Attn: Dennis Webster

ELECTRONIC      SUN: Aquaterra Tech.  
COPY TO

Attn: Tiffani Doerr

ELECTRONIC      LLI  
COPY TO

Attn: EDD Group

ELECTRONIC      Langan  
COPY TO

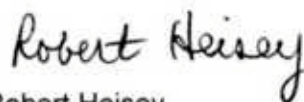
Attn: Kristen Ward

ELECTRONIC      Aquaterra Tech  
COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Robert Heisey  
Senior Specialist



**Sample Description:** SWS-1\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-1\_040711

LLI Sample # WW 6253864  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:30 by SS

SUN: Aquaterra Tech.

Submitted: 04/08/2011 14:10

PO Box 744

Reported: 04/19/2011 11:17

West Chester PA 19381

SWS01

| CAT No.              | Analysis Name               | CAS Number          | As Received Result   | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------|---------------------|----------------------|------------------------------------|------------------------------------|-----------------|
| <b>GC/MS</b>         | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 10943                | Benzene                     | 71-43-2             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2-Dichloroethane          | 107-06-2            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Ethylbenzene                | 100-41-4            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Isopropylbenzene            | 98-82-8             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Methyl Tertiary Butyl Ether | 1634-04-4           | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Toluene                     | 108-88-3            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2,4-Trimethylbenzene      | 95-63-6             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | 1,3,5-Trimethylbenzene      | 108-67-8            | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Xylene (Total)              | 1330-20-7           | < 1                  | 1                                  | 0.5                                | 1               |
| <b>GC/MS</b>         | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07805                | Chrysene                    | 218-01-9            | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Fluorene                    | 86-73-7             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Naphthalene                 | 91-20-3             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Phenanthrene                | 85-01-8             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Pyrene                      | 129-00-0            | < 5                  | 5                                  | 1                                  | 1               |
| <b>GC</b>            | <b>Miscellaneous</b>        | <b>SW-846 8011</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07879                | Ethylene dibromide          | 106-93-4            | < 0.029              | 0.029                              | 0.0097                             | 1               |
| <b>Metals</b>        |                             | <b>SW-846 6010B</b> | <b>mg/l</b>          | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                | Aluminum                    | 7429-90-5           | < 0.200              | 0.200                              | 0.0834                             | 1               |
| 07044                | Antimony                    | 7440-36-0           | < 0.0200             | 0.0200                             | 0.0100                             | 1               |
| 07035                | Arsenic                     | 7440-38-2           | < 0.0200             | 0.0200                             | 0.0098                             | 1               |
| 07046                | Barium                      | 7440-39-3           | 0.0853               | 0.0050                             | 0.00060                            | 1               |
| 07047                | Beryllium                   | 7440-41-7           | < 0.0050             | 0.0050                             | 0.0014                             | 1               |
| 07049                | Cadmium                     | 7440-43-9           | < 0.0050             | 0.0050                             | 0.0020                             | 1               |
| 01750                | Calcium                     | 7440-70-2           | 68.3                 | 0.200                              | 0.0702                             | 1               |
| 07051                | Chromium                    | 7440-47-3           | < 0.0150             | 0.0150                             | 0.0034                             | 1               |
| 07052                | Cobalt                      | 7440-48-4           | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 07053                | Copper                      | 7440-50-8           | < 0.0100             | 0.0100                             | 0.0027                             | 1               |
| 01754                | Iron                        | 7439-89-6           | 0.740                | 0.200                              | 0.0522                             | 1               |
| 07055                | Lead                        | 7439-92-1           | 0.0193               | 0.0150                             | 0.0069                             | 1               |
| 01757                | Magnesium                   | 7439-95-4           | 28.0                 | 0.100                              | 0.0172                             | 1               |
| 07058                | Manganese                   | 7439-96-5           | 0.100                | 0.0050                             | 0.00084                            | 1               |
| 07061                | Nickel                      | 7440-02-0           | < 0.0100             | 0.0100                             | 0.0030                             | 1               |
| 01762                | Potassium                   | 7440-09-7           | 5.43                 | 0.500                              | 0.239                              | 1               |
| 07036                | Selenium                    | 7782-49-2           | < 0.0200             | 0.0200                             | 0.0089                             | 1               |
| 07066                | Silver                      | 7440-22-4           | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 01767                | Sodium                      | 7440-23-5           | 18.7                 | 1.00                               | 0.433                              | 1               |
| 07022                | Thallium                    | 7440-28-0           | < 0.0300             | 0.0300                             | 0.0140                             | 1               |
| 07071                | Vanadium                    | 7440-62-2           | < 0.0050             | 0.0050                             | 0.0025                             | 1               |
| 07072                | Zinc                        | 7440-66-6           | 0.0295               | 0.0200                             | 0.0081                             | 1               |
|                      |                             | <b>SW-846 7470A</b> | <b>mg/l</b>          | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                | Mercury                     | 7439-97-6           | < 0.00020            | 0.00020                            | 0.000046                           | 1               |
| <b>Wet Chemistry</b> | <b>SM20 2340 C</b>          |                     | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b>               | <b>mg/l as CaCO3</b>               |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-1\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-1\_040711

**LLI Sample #** WW 6253864  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

SWS01

| CAT No.              | Analysis Name  | CAS Number  | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|----------------|-------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Wet Chemistry</b> |                |             |                    |                                    |                                    |                 |
| 00216                | Total Hardness | SM20 2340 C | mg/l as CaCO3      | mg/l as CaCO3                      | mg/l as CaCO3                      |                 |
|                      |                | 471-34-1    | 270                | 6.0                                | 2.0                                | 2               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs     | SW-846 8260B | 1      | F111023AA    | 04/13/2011 01:27       | Kelly E Keller    | 1               |
| 01163   | GC/MS VOA Water Prep          | SW-846 5030B | 1      | F111023AA    | 04/13/2011 01:27       | Kelly E Keller    | 1               |
| 07805   | PAHs by 8270                  | SW-846 8270C | 1      | 11103WAB026  | 04/14/2011 10:13       | Joseph M Gambler  | 1               |
| 07807   | BNA Water Extraction          | SW-846 3510C | 1      | 11103WAB026  | 04/13/2011 13:30       | Olivia I Santiago | 1               |
| 07879   | EDB in Wastewater             | SW-846 8011  | 1      | 111030009A   | 04/15/2011 02:05       | James H Place     | 1               |
| 07786   | EDB Extraction                | SW-846 8011  | 1      | 111030009A   | 04/13/2011 14:00       | Kelli M Barto     | 1               |
| 01743   | Aluminum                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07044   | Antimony                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07035   | Arsenic                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07046   | Barium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07047   | Beryllium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07049   | Cadmium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 01750   | Calcium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07051   | Chromium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07052   | Cobalt                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07053   | Copper                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:30       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:03       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:00       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |
| 00216   | Total Hardness                | SM20 2340 C  | 1      | 11102021602B | 04/12/2011 14:10       | Susan A Engle     | 2               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-1\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-1\_040711

LLI Sample # WW 6253865  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

| CAT No.                 | Analysis Name | CAS Number          | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|-------------------------|---------------|---------------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Metals Dissolved</b> |               | <b>SW-846 6010B</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                   | Aluminum      | 7429-90-5           | < 0.200            | 0.200                              | 0.0834                             | 1               |
| 07044                   | Antimony      | 7440-36-0           | < 0.0200           | 0.0200                             | 0.0100                             | 1               |
| 07035                   | Arsenic       | 7440-38-2           | < 0.0200           | 0.0200                             | 0.0098                             | 1               |
| 07046                   | Barium        | 7440-39-3           | 0.0408             | 0.0050                             | 0.00060                            | 1               |
| 07047                   | Beryllium     | 7440-41-7           | < 0.0050           | 0.0050                             | 0.0014                             | 1               |
| 07049                   | Cadmium       | 7440-43-9           | < 0.0050           | 0.0050                             | 0.0020                             | 1               |
| 01750                   | Calcium       | 7440-70-2           | 67.0               | 0.200                              | 0.0702                             | 1               |
| 07051                   | Chromium      | 7440-47-3           | < 0.0150           | 0.0150                             | 0.0034                             | 1               |
| 07052                   | Cobalt        | 7440-48-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 07053                   | Copper        | 7440-50-8           | < 0.0100           | 0.0100                             | 0.0027                             | 1               |
| 01754                   | Iron          | 7439-89-6           | 0.268              | 0.200                              | 0.0522                             | 1               |
| 07055                   | Lead          | 7439-92-1           | < 0.0150           | 0.0150                             | 0.0069                             | 1               |
| 01757                   | Magnesium     | 7439-95-4           | 27.5               | 0.100                              | 0.0172                             | 1               |
| 07058                   | Manganese     | 7439-96-5           | 0.0673             | 0.0050                             | 0.00084                            | 1               |
| 07061                   | Nickel        | 7440-02-0           | < 0.0100           | 0.0100                             | 0.0030                             | 1               |
| 01762                   | Potassium     | 7440-09-7           | 5.39               | 0.500                              | 0.239                              | 1               |
| 07036                   | Selenium      | 7782-49-2           | < 0.0200           | 0.0200                             | 0.0089                             | 1               |
| 07066                   | Silver        | 7440-22-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 01767                   | Sodium        | 7440-23-5           | 18.8               | 1.00                               | 0.433                              | 1               |
| 07022                   | Thallium      | 7440-28-0           | < 0.0300           | 0.0300                             | 0.0140                             | 1               |
| 07071                   | Vanadium      | 7440-62-2           | < 0.0050           | 0.0050                             | 0.0025                             | 1               |
| 07072                   | Zinc          | 7440-66-6           | < 0.0200           | 0.0200                             | 0.0081                             | 1               |
|                         |               | <b>SW-846 7470A</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                   | Mercury       | 7439-97-6           | < 0.00020          | 0.00020                            | 0.000046                           | 1               |

### General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|---------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 01743   | Aluminum      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07044   | Antimony      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07035   | Arsenic       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07046   | Barium        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07047   | Beryllium     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07049   | Cadmium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 01750   | Calcium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07051   | Chromium      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07052   | Cobalt        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |
| 07053   | Copper        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-1\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-1\_040711

LLI Sample # WW 6253865  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:33       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:07       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:01       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |

**Sample Description:** SWS-2\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-2\_040711

LLI Sample # WW 6253866  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 12:50 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

SWS02

| CAT No.              | Analysis Name               | CAS Number           | As Received Result   | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------|----------------------|----------------------|------------------------------------|------------------------------------|-----------------|
| <b>GC/MS</b>         | <b>Volatiles</b>            | <b>SW-846 8260B</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 10943                | Benzene                     | 71-43-2              | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2-Dichloroethane          | 107-06-2             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Ethylbenzene                | 100-41-4             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Isopropylbenzene            | 98-82-8              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Methyl Tertiary Butyl Ether | 1634-04-4            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Toluene                     | 108-88-3             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2,4-Trimethylbenzene      | 95-63-6              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | 1,3,5-Trimethylbenzene      | 108-67-8             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Xylene (Total)              | 1330-20-7            | < 1                  | 1                                  | 0.5                                | 1               |
| <b>GC/MS</b>         | <b>Semivolatiles</b>        | <b>SW-846 8270C</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07805                | Chrysene                    | 218-01-9             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Fluorene                    | 86-73-7              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Naphthalene                 | 91-20-3              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Phenanthrene                | 85-01-8              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Pyrene                      | 129-00-0             | < 5                  | 5                                  | 1                                  | 1               |
| <b>GC</b>            | <b>Miscellaneous</b>        | <b>SW-846 8011</b>   | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07879                | Ethylene dibromide          | 106-93-4             | < 0.029              | 0.029                              | 0.0097                             | 1               |
| <b>Metals</b>        | <b>SW-846 6010B</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 01743                | Aluminum                    | 7429-90-5            | < 0.200              | 0.200                              | 0.0834                             | 1               |
| 07044                | Antimony                    | 7440-36-0            | < 0.0200             | 0.0200                             | 0.0100                             | 1               |
| 07035                | Arsenic                     | 7440-38-2            | < 0.0200             | 0.0200                             | 0.0098                             | 1               |
| 07046                | Barium                      | 7440-39-3            | 0.0972               | 0.0050                             | 0.00060                            | 1               |
| 07047                | Beryllium                   | 7440-41-7            | < 0.0050             | 0.0050                             | 0.0014                             | 1               |
| 07049                | Cadmium                     | 7440-43-9            | < 0.0050             | 0.0050                             | 0.0020                             | 1               |
| 01750                | Calcium                     | 7440-70-2            | 75.7                 | 0.200                              | 0.0702                             | 1               |
| 07051                | Chromium                    | 7440-47-3            | < 0.0150             | 0.0150                             | 0.0034                             | 1               |
| 07052                | Cobalt                      | 7440-48-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 07053                | Copper                      | 7440-50-8            | < 0.0100             | 0.0100                             | 0.0027                             | 1               |
| 01754                | Iron                        | 7439-89-6            | 1.85                 | 0.200                              | 0.0522                             | 1               |
| 07055                | Lead                        | 7439-92-1            | < 0.0150             | 0.0150                             | 0.0069                             | 1               |
| 01757                | Magnesium                   | 7439-95-4            | 32.1                 | 0.100                              | 0.0172                             | 1               |
| 07058                | Manganese                   | 7439-96-5            | 0.310                | 0.0050                             | 0.00084                            | 1               |
| 07061                | Nickel                      | 7440-02-0            | 0.0182               | 0.0100                             | 0.0030                             | 1               |
| 01762                | Potassium                   | 7440-09-7            | 5.63                 | 0.500                              | 0.239                              | 1               |
| 07036                | Selenium                    | 7782-49-2            | < 0.0200             | 0.0200                             | 0.0089                             | 1               |
| 07066                | Silver                      | 7440-22-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 01767                | Sodium                      | 7440-23-5            | 18.7                 | 1.00                               | 0.433                              | 1               |
| 07022                | Thallium                    | 7440-28-0            | < 0.0300             | 0.0300                             | 0.0140                             | 1               |
| 07071                | Vanadium                    | 7440-62-2            | < 0.0050             | 0.0050                             | 0.0025                             | 1               |
| 07072                | Zinc                        | 7440-66-6            | 0.138                | 0.0200                             | 0.0081                             | 1               |
|                      | <b>SW-846 7470A</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 00259                | Mercury                     | 7439-97-6            | < 0.00020            | 0.00020                            | 0.000046                           | 1               |
| <b>Wet Chemistry</b> | <b>SM20 2340 C</b>          | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b>               |                                    |                 |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SWS-2\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-2\_040711

**LLI Sample #** WW 6253866  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 12:50 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

SWS02

| CAT No.              | Analysis Name  | CAS Number  | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|----------------|-------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Wet Chemistry</b> |                |             |                    |                                    |                                    |                 |
| 00216                | Total Hardness | SM20 2340 C | mg/l as CaCO3      | mg/l as CaCO3                      | mg/l as CaCO3                      |                 |
|                      |                | 471-34-1    | 327                | 15.0                               | 5.0                                | 5               |

### General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs     | SW-846 8260B | 1      | F111023AA    | 04/13/2011 01:49       | Kelly E Keller    | 1               |
| 01163   | GC/MS VOA Water Prep          | SW-846 5030B | 1      | F111023AA    | 04/13/2011 01:49       | Kelly E Keller    | 1               |
| 07805   | PAHs by 8270                  | SW-846 8270C | 1      | 11103WAB026  | 04/14/2011 10:39       | Joseph M Gambler  | 1               |
| 07807   | BNA Water Extraction          | SW-846 3510C | 1      | 11103WAB026  | 04/13/2011 13:30       | Olivia I Santiago | 1               |
| 07879   | EDB in Wastewater             | SW-846 8011  | 1      | 111030009A   | 04/15/2011 02:35       | James H Place     | 1               |
| 07786   | EDB Extraction                | SW-846 8011  | 1      | 111030009A   | 04/13/2011 14:00       | Kelli M Barto     | 1               |
| 01743   | Aluminum                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07044   | Antimony                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07035   | Arsenic                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07046   | Barium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07047   | Beryllium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07049   | Cadmium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 01750   | Calcium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07051   | Chromium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07052   | Cobalt                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07053   | Copper                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:44       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:10       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:02       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |
| 00216   | Total Hardness                | SM20 2340 C  | 1      | 11102021602B | 04/12/2011 14:10       | Susan A Engle     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-2\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-2\_040711

LLI Sample # WW 6253867  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 12:50 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

| CAT No.                 | Analysis Name | CAS Number          | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|-------------------------|---------------|---------------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Metals Dissolved</b> |               | <b>SW-846 6010B</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                   | Aluminum      | 7429-90-5           | < 0.200            | 0.200                              | 0.0834                             | 1               |
| 07044                   | Antimony      | 7440-36-0           | < 0.0200           | 0.0200                             | 0.0100                             | 1               |
| 07035                   | Arsenic       | 7440-38-2           | < 0.0200           | 0.0200                             | 0.0098                             | 1               |
| 07046                   | Barium        | 7440-39-3           | 0.0939             | 0.0050                             | 0.00060                            | 1               |
| 07047                   | Beryllium     | 7440-41-7           | < 0.0050           | 0.0050                             | 0.0014                             | 1               |
| 07049                   | Cadmium       | 7440-43-9           | < 0.0050           | 0.0050                             | 0.0020                             | 1               |
| 01750                   | Calcium       | 7440-70-2           | 78.0               | 0.200                              | 0.0702                             | 1               |
| 07051                   | Chromium      | 7440-47-3           | < 0.0150           | 0.0150                             | 0.0034                             | 1               |
| 07052                   | Cobalt        | 7440-48-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 07053                   | Copper        | 7440-50-8           | < 0.0100           | 0.0100                             | 0.0027                             | 1               |
| 01754                   | Iron          | 7439-89-6           | 0.540              | 0.200                              | 0.0522                             | 1               |
| 07055                   | Lead          | 7439-92-1           | < 0.0150           | 0.0150                             | 0.0069                             | 1               |
| 01757                   | Magnesium     | 7439-95-4           | 33.6               | 0.100                              | 0.0172                             | 1               |
| 07058                   | Manganese     | 7439-96-5           | 0.260              | 0.0050                             | 0.00084                            | 1               |
| 07061                   | Nickel        | 7440-02-0           | 0.0181             | 0.0100                             | 0.0030                             | 1               |
| 01762                   | Potassium     | 7440-09-7           | 5.67               | 0.500                              | 0.239                              | 1               |
| 07036                   | Selenium      | 7782-49-2           | < 0.0200           | 0.0200                             | 0.0089                             | 1               |
| 07066                   | Silver        | 7440-22-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 01767                   | Sodium        | 7440-23-5           | 19.1               | 1.00                               | 0.433                              | 1               |
| 07022                   | Thallium      | 7440-28-0           | < 0.0300           | 0.0300                             | 0.0140                             | 1               |
| 07071                   | Vanadium      | 7440-62-2           | < 0.0050           | 0.0050                             | 0.0025                             | 1               |
| 07072                   | Zinc          | 7440-66-6           | 0.109              | 0.0200                             | 0.0081                             | 1               |
|                         |               | <b>SW-846 7470A</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                   | Mercury       | 7439-97-6           | < 0.00020          | 0.00020                            | 0.000046                           | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|---------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 01743   | Aluminum      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07044   | Antimony      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07035   | Arsenic       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07046   | Barium        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07047   | Beryllium     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07049   | Cadmium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 01750   | Calcium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07051   | Chromium      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07052   | Cobalt        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |
| 07053   | Copper        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-2\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-2\_040711

LLI Sample # WW 6253867  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 12:50 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:48       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:14       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:03       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |

**Sample Description:** SWS-3\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-3\_040711

LLI Sample # WW 6253868  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

SWS03

| CAT No.              | Analysis Name               | CAS Number           | As Received Result   | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------|----------------------|----------------------|------------------------------------|------------------------------------|-----------------|
| <b>GC/MS</b>         | <b>Volatiles</b>            | <b>SW-846 8260B</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 10943                | Benzene                     | 71-43-2              | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2-Dichloroethane          | 107-06-2             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Ethylbenzene                | 100-41-4             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Isopropylbenzene            | 98-82-8              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Methyl Tertiary Butyl Ether | 1634-04-4            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Toluene                     | 108-88-3             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2,4-Trimethylbenzene      | 95-63-6              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | 1,3,5-Trimethylbenzene      | 108-67-8             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Xylene (Total)              | 1330-20-7            | < 1                  | 1                                  | 0.5                                | 1               |
| <b>GC/MS</b>         | <b>Semivolatiles</b>        | <b>SW-846 8270C</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07805                | Chrysene                    | 218-01-9             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Fluorene                    | 86-73-7              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Naphthalene                 | 91-20-3              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Phenanthrene                | 85-01-8              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Pyrene                      | 129-00-0             | < 5                  | 5                                  | 1                                  | 1               |
| <b>GC</b>            | <b>Miscellaneous</b>        | <b>SW-846 8011</b>   | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07879                | Ethylene dibromide          | 106-93-4             | < 0.030              | 0.030                              | 0.0098                             | 1               |
| <b>Metals</b>        | <b>SW-846 6010B</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 01743                | Aluminum                    | 7429-90-5            | < 0.200              | 0.200                              | 0.0834                             | 1               |
| 07044                | Antimony                    | 7440-36-0            | < 0.0200             | 0.0200                             | 0.0100                             | 1               |
| 07035                | Arsenic                     | 7440-38-2            | < 0.0200             | 0.0200                             | 0.0098                             | 1               |
| 07046                | Barium                      | 7440-39-3            | 0.0910               | 0.0050                             | 0.00060                            | 1               |
| 07047                | Beryllium                   | 7440-41-7            | < 0.0050             | 0.0050                             | 0.0014                             | 1               |
| 07049                | Cadmium                     | 7440-43-9            | < 0.0050             | 0.0050                             | 0.0020                             | 1               |
| 01750                | Calcium                     | 7440-70-2            | 94.3                 | 0.200                              | 0.0702                             | 1               |
| 07051                | Chromium                    | 7440-47-3            | < 0.0150             | 0.0150                             | 0.0034                             | 1               |
| 07052                | Cobalt                      | 7440-48-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 07053                | Copper                      | 7440-50-8            | < 0.0100             | 0.0100                             | 0.0027                             | 1               |
| 01754                | Iron                        | 7439-89-6            | 0.693                | 0.200                              | 0.0522                             | 1               |
| 07055                | Lead                        | 7439-92-1            | < 0.0150             | 0.0150                             | 0.0069                             | 1               |
| 01757                | Magnesium                   | 7439-95-4            | 57.6                 | 0.100                              | 0.0172                             | 1               |
| 07058                | Manganese                   | 7439-96-5            | 0.167                | 0.0050                             | 0.00084                            | 1               |
| 07061                | Nickel                      | 7440-02-0            | < 0.0100             | 0.0100                             | 0.0030                             | 1               |
| 01762                | Potassium                   | 7440-09-7            | 7.25                 | 0.500                              | 0.239                              | 1               |
| 07036                | Selenium                    | 7782-49-2            | < 0.0200             | 0.0200                             | 0.0089                             | 1               |
| 07066                | Silver                      | 7440-22-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 01767                | Sodium                      | 7440-23-5            | 22.8                 | 1.00                               | 0.433                              | 1               |
| 07022                | Thallium                    | 7440-28-0            | < 0.0300             | 0.0300                             | 0.0140                             | 1               |
| 07071                | Vanadium                    | 7440-62-2            | < 0.0050             | 0.0050                             | 0.0025                             | 1               |
| 07072                | Zinc                        | 7440-66-6            | 0.0425               | 0.0200                             | 0.0081                             | 1               |
|                      | <b>SW-846 7470A</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 00259                | Mercury                     | 7439-97-6            | < 0.00020            | 0.00020                            | 0.000046                           | 1               |
| <b>Wet Chemistry</b> | <b>SM20 2340 C</b>          | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b>               |                                    |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-3\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-3\_040711

**LLI Sample #** WW 6253868  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:40 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

SWS03

| CAT No.              | Analysis Name  | CAS Number  | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|----------------|-------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Wet Chemistry</b> |                |             |                    |                                    |                                    |                 |
| 00216                | Total Hardness | SM20 2340 C | mg/l as CaCO3      | mg/l as CaCO3                      | mg/l as CaCO3                      |                 |
|                      |                | 471-34-1    | 487                | 15.0                               | 5.0                                | 5               |

### General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs     | SW-846 8260B | 1      | F111023AA    | 04/13/2011 02:10       | Kelly E Keller    | 1               |
| 01163   | GC/MS VOA Water Prep          | SW-846 5030B | 1      | F111023AA    | 04/13/2011 02:10       | Kelly E Keller    | 1               |
| 07805   | PAHs by 8270                  | SW-846 8270C | 1      | 11103WAB026  | 04/14/2011 11:06       | Joseph M Gambler  | 1               |
| 07807   | BNA Water Extraction          | SW-846 3510C | 1      | 11103WAB026  | 04/13/2011 13:30       | Olivia I Santiago | 1               |
| 07879   | EDB in Wastewater             | SW-846 8011  | 1      | 111030009A   | 04/15/2011 03:05       | James H Place     | 1               |
| 07786   | EDB Extraction                | SW-846 8011  | 1      | 111030009A   | 04/13/2011 14:00       | Kelli M Barto     | 1               |
| 01743   | Aluminum                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07044   | Antimony                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07035   | Arsenic                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07046   | Barium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07047   | Beryllium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07049   | Cadmium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 01750   | Calcium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07051   | Chromium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07052   | Cobalt                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07053   | Copper                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:52       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:18       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:08       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |
| 00216   | Total Hardness                | SM20 2340 C  | 1      | 11102021602B | 04/12/2011 14:10       | Susan A Engle     | 5               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SWS-3\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-3\_040711

LLI Sample # WW 6253869  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

| CAT No.                 | Analysis Name | CAS Number          | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|-------------------------|---------------|---------------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Metals Dissolved</b> |               |                     |                    |                                    |                                    |                 |
|                         |               | <b>SW-846 6010B</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                   | Aluminum      | 7429-90-5           | < 0.200            | 0.200                              | 0.0834                             | 1               |
| 07044                   | Antimony      | 7440-36-0           | < 0.0200           | 0.0200                             | 0.0100                             | 1               |
| 07035                   | Arsenic       | 7440-38-2           | < 0.0200           | 0.0200                             | 0.0098                             | 1               |
| 07046                   | Barium        | 7440-39-3           | 0.0823             | 0.0050                             | 0.00060                            | 1               |
| 07047                   | Beryllium     | 7440-41-7           | < 0.0050           | 0.0050                             | 0.0014                             | 1               |
| 07049                   | Cadmium       | 7440-43-9           | < 0.0050           | 0.0050                             | 0.0020                             | 1               |
| 01750                   | Calcium       | 7440-70-2           | 91.6               | 0.200                              | 0.0702                             | 1               |
| 07051                   | Chromium      | 7440-47-3           | < 0.0150           | 0.0150                             | 0.0034                             | 1               |
| 07052                   | Cobalt        | 7440-48-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 07053                   | Copper        | 7440-50-8           | < 0.0100           | 0.0100                             | 0.0027                             | 1               |
| 01754                   | Iron          | 7439-89-6           | < 0.200            | 0.200                              | 0.0522                             | 1               |
| 07055                   | Lead          | 7439-92-1           | < 0.0150           | 0.0150                             | 0.0069                             | 1               |
| 01757                   | Magnesium     | 7439-95-4           | 56.4               | 0.100                              | 0.0172                             | 1               |
| 07058                   | Manganese     | 7439-96-5           | 0.0081             | 0.0050                             | 0.00084                            | 1               |
| 07061                   | Nickel        | 7440-02-0           | < 0.0100           | 0.0100                             | 0.0030                             | 1               |
| 01762                   | Potassium     | 7440-09-7           | 7.10               | 0.500                              | 0.239                              | 1               |
| 07036                   | Selenium      | 7782-49-2           | < 0.0200           | 0.0200                             | 0.0089                             | 1               |
| 07066                   | Silver        | 7440-22-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 01767                   | Sodium        | 7440-23-5           | 21.6               | 1.00                               | 0.433                              | 1               |
| 07022                   | Thallium      | 7440-28-0           | < 0.0300           | 0.0300                             | 0.0140                             | 1               |
| 07071                   | Vanadium      | 7440-62-2           | < 0.0050           | 0.0050                             | 0.0025                             | 1               |
| 07072                   | Zinc          | 7440-66-6           | 0.0218             | 0.0200                             | 0.0081                             | 1               |
|                         |               | <b>SW-846 7470A</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                   | Mercury       | 7439-97-6           | < 0.00020          | 0.00020                            | 0.000046                           | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|---------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 01743   | Aluminum      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07044   | Antimony      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07035   | Arsenic       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07046   | Barium        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07047   | Beryllium     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07049   | Cadmium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 01750   | Calcium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07051   | Chromium      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07052   | Cobalt        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |
| 07053   | Copper        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-3\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-3\_040711

LLI Sample # WW 6253869  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 11:40 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:55       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:21       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:12       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |

**Sample Description:** SWS-4\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-4\_040711

LLI Sample # WW 6253870  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

SWS04

| CAT No.              | Analysis Name               | CAS Number           | As Received Result   | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------|----------------------|----------------------|------------------------------------|------------------------------------|-----------------|
| <b>GC/MS</b>         | <b>Volatiles</b>            | <b>SW-846 8260B</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 10943                | Benzene                     | 71-43-2              | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2-Dichloroethane          | 107-06-2             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Ethylbenzene                | 100-41-4             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Isopropylbenzene            | 98-82-8              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Methyl Tertiary Butyl Ether | 1634-04-4            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Toluene                     | 108-88-3             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2,4-Trimethylbenzene      | 95-63-6              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | 1,3,5-Trimethylbenzene      | 108-67-8             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Xylene (Total)              | 1330-20-7            | < 1                  | 1                                  | 0.5                                | 1               |
| <b>GC/MS</b>         | <b>Semivolatiles</b>        | <b>SW-846 8270C</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07805                | Chrysene                    | 218-01-9             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Fluorene                    | 86-73-7              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Naphthalene                 | 91-20-3              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Phenanthrene                | 85-01-8              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Pyrene                      | 129-00-0             | < 5                  | 5                                  | 1                                  | 1               |
| <b>GC</b>            | <b>Miscellaneous</b>        | <b>SW-846 8011</b>   | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07879                | Ethylene dibromide          | 106-93-4             | < 0.029              | 0.029                              | 0.0098                             | 1               |
| <b>Metals</b>        | <b>SW-846 6010B</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 01743                | Aluminum                    | 7429-90-5            | < 0.200              | 0.200                              | 0.0834                             | 1               |
| 07044                | Antimony                    | 7440-36-0            | < 0.0200             | 0.0200                             | 0.0100                             | 1               |
| 07035                | Arsenic                     | 7440-38-2            | < 0.0200             | 0.0200                             | 0.0098                             | 1               |
| 07046                | Barium                      | 7440-39-3            | 0.138                | 0.0050                             | 0.00060                            | 1               |
| 07047                | Beryllium                   | 7440-41-7            | < 0.0050             | 0.0050                             | 0.0014                             | 1               |
| 07049                | Cadmium                     | 7440-43-9            | < 0.0050             | 0.0050                             | 0.0020                             | 1               |
| 01750                | Calcium                     | 7440-70-2            | 119                  | 0.200                              | 0.0702                             | 1               |
| 07051                | Chromium                    | 7440-47-3            | < 0.0150             | 0.0150                             | 0.0034                             | 1               |
| 07052                | Cobalt                      | 7440-48-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 07053                | Copper                      | 7440-50-8            | < 0.0100             | 0.0100                             | 0.0027                             | 1               |
| 01754                | Iron                        | 7439-89-6            | 1.60                 | 0.200                              | 0.0522                             | 1               |
| 07055                | Lead                        | 7439-92-1            | < 0.0150             | 0.0150                             | 0.0069                             | 1               |
| 01757                | Magnesium                   | 7439-95-4            | 74.7                 | 0.100                              | 0.0172                             | 1               |
| 07058                | Manganese                   | 7439-96-5            | 0.426                | 0.0050                             | 0.00084                            | 1               |
| 07061                | Nickel                      | 7440-02-0            | < 0.0100             | 0.0100                             | 0.0030                             | 1               |
| 01762                | Potassium                   | 7440-09-7            | 11.1                 | 0.500                              | 0.239                              | 1               |
| 07036                | Selenium                    | 7782-49-2            | < 0.0200             | 0.0200                             | 0.0089                             | 1               |
| 07066                | Silver                      | 7440-22-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 01767                | Sodium                      | 7440-23-5            | 17.8                 | 1.00                               | 0.433                              | 1               |
| 07022                | Thallium                    | 7440-28-0            | < 0.0300             | 0.0300                             | 0.0140                             | 1               |
| 07071                | Vanadium                    | 7440-62-2            | < 0.0050             | 0.0050                             | 0.0025                             | 1               |
| 07072                | Zinc                        | 7440-66-6            | < 0.0200             | 0.0200                             | 0.0081                             | 1               |
|                      | <b>SW-846 7470A</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 00259                | Mercury                     | 7439-97-6            | < 0.00020            | 0.00020                            | 0.000046                           | 1               |
| <b>Wet Chemistry</b> | <b>SM20 2340 C</b>          | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b>               |                                    |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-4\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-4\_040711

**LLI Sample #** WW 6253870  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

SWS04

| CAT No.              | Analysis Name  | CAS Number  | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|----------------|-------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Wet Chemistry</b> |                |             |                    |                                    |                                    |                 |
| 00216                | Total Hardness | SM20 2340 C | mg/l as CaCO3      | mg/l as CaCO3                      | mg/l as CaCO3                      |                 |
|                      |                | 471-34-1    | 614                | 15.0                               | 5.0                                | 5               |

### General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs     | SW-846 8260B | 1      | F111023AA    | 04/13/2011 02:32       | Kelly E Keller    | 1               |
| 01163   | GC/MS VOA Water Prep          | SW-846 5030B | 1      | F111023AA    | 04/13/2011 02:32       | Kelly E Keller    | 1               |
| 07805   | PAHs by 8270                  | SW-846 8270C | 1      | 11103WAB026  | 04/14/2011 11:32       | Joseph M Gambler  | 1               |
| 07807   | BNA Water Extraction          | SW-846 3510C | 1      | 11103WAB026  | 04/13/2011 13:30       | Olivia I Santiago | 1               |
| 07879   | EDB in Wastewater             | SW-846 8011  | 1      | 111030009A   | 04/15/2011 03:35       | James H Place     | 1               |
| 07786   | EDB Extraction                | SW-846 8011  | 1      | 111030009A   | 04/13/2011 14:00       | Kelli M Barto     | 1               |
| 01743   | Aluminum                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07044   | Antimony                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07035   | Arsenic                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07046   | Barium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07047   | Beryllium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07049   | Cadmium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 01750   | Calcium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07051   | Chromium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07052   | Cobalt                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07053   | Copper                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 17:59       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:25       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:13       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |
| 00216   | Total Hardness                | SM20 2340 C  | 1      | 11102021602B | 04/12/2011 14:10       | Susan A Engle     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-4\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-4\_040711

LLI Sample # WW 6253871  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

| CAT No.                 | Analysis Name | CAS Number          | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|-------------------------|---------------|---------------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Metals Dissolved</b> |               | <b>SW-846 6010B</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                   | Aluminum      | 7429-90-5           | < 0.200            | 0.200                              | 0.0834                             | 1               |
| 07044                   | Antimony      | 7440-36-0           | < 0.0200           | 0.0200                             | 0.0100                             | 1               |
| 07035                   | Arsenic       | 7440-38-2           | < 0.0200           | 0.0200                             | 0.0098                             | 1               |
| 07046                   | Barium        | 7440-39-3           | 0.124              | 0.0050                             | 0.00060                            | 1               |
| 07047                   | Beryllium     | 7440-41-7           | < 0.0050           | 0.0050                             | 0.0014                             | 1               |
| 07049                   | Cadmium       | 7440-43-9           | < 0.0050           | 0.0050                             | 0.0020                             | 1               |
| 01750                   | Calcium       | 7440-70-2           | 119                | 0.200                              | 0.0702                             | 1               |
| 07051                   | Chromium      | 7440-47-3           | < 0.0150           | 0.0150                             | 0.0034                             | 1               |
| 07052                   | Cobalt        | 7440-48-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 07053                   | Copper        | 7440-50-8           | < 0.0100           | 0.0100                             | 0.0027                             | 1               |
| 01754                   | Iron          | 7439-89-6           | < 0.200            | 0.200                              | 0.0522                             | 1               |
| 07055                   | Lead          | 7439-92-1           | < 0.0150           | 0.0150                             | 0.0069                             | 1               |
| 01757                   | Magnesium     | 7439-95-4           | 74.7               | 0.100                              | 0.0172                             | 1               |
| 07058                   | Manganese     | 7439-96-5           | 0.197              | 0.0050                             | 0.00084                            | 1               |
| 07061                   | Nickel        | 7440-02-0           | < 0.0100           | 0.0100                             | 0.0030                             | 1               |
| 01762                   | Potassium     | 7440-09-7           | 11.0               | 0.500                              | 0.239                              | 1               |
| 07036                   | Selenium      | 7782-49-2           | < 0.0200           | 0.0200                             | 0.0089                             | 1               |
| 07066                   | Silver        | 7440-22-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 01767                   | Sodium        | 7440-23-5           | 18.5               | 1.00                               | 0.433                              | 1               |
| 07022                   | Thallium      | 7440-28-0           | < 0.0300           | 0.0300                             | 0.0140                             | 1               |
| 07071                   | Vanadium      | 7440-62-2           | < 0.0050           | 0.0050                             | 0.0025                             | 1               |
| 07072                   | Zinc          | 7440-66-6           | < 0.0200           | 0.0200                             | 0.0081                             | 1               |
|                         |               | <b>SW-846 7470A</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                   | Mercury       | 7439-97-6           | < 0.00020          | 0.00020                            | 0.000046                           | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|---------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 01743   | Aluminum      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07044   | Antimony      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07035   | Arsenic       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07046   | Barium        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07047   | Beryllium     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07049   | Cadmium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 01750   | Calcium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07051   | Chromium      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07052   | Cobalt        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |
| 07053   | Copper        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin | 1               |

\*=This limit was used in the evaluation of the final result



**Sample Description:** SWS-4\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-4\_040711

LLI Sample # WW 6253871  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:45 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 18:03       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:29       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:14       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |

**Sample Description:** SWS-5\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-5\_040711

LLI Sample # WW 6253872  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/08/2011 14:10

Reported: 04/19/2011 11:17

SWS05

| CAT No.              | Analysis Name               | CAS Number           | As Received Result   | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|-----------------------------|----------------------|----------------------|------------------------------------|------------------------------------|-----------------|
| <b>GC/MS</b>         | <b>Volatiles</b>            | <b>SW-846 8260B</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 10943                | Benzene                     | 71-43-2              | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2-Dichloroethane          | 107-06-2             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Ethylbenzene                | 100-41-4             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Isopropylbenzene            | 98-82-8              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Methyl Tertiary Butyl Ether | 1634-04-4            | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | Toluene                     | 108-88-3             | < 1                  | 1                                  | 0.5                                | 1               |
| 10943                | 1,2,4-Trimethylbenzene      | 95-63-6              | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | 1,3,5-Trimethylbenzene      | 108-67-8             | < 2                  | 2                                  | 0.5                                | 1               |
| 10943                | Xylene (Total)              | 1330-20-7            | < 1                  | 1                                  | 0.5                                | 1               |
| <b>GC/MS</b>         | <b>Semivolatiles</b>        | <b>SW-846 8270C</b>  | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07805                | Chrysene                    | 218-01-9             | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Fluorene                    | 86-73-7              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Naphthalene                 | 91-20-3              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Phenanthrene                | 85-01-8              | < 5                  | 5                                  | 1                                  | 1               |
| 07805                | Pyrene                      | 129-00-0             | < 5                  | 5                                  | 1                                  | 1               |
| <b>GC</b>            | <b>Miscellaneous</b>        | <b>SW-846 8011</b>   | <b>ug/l</b>          | <b>ug/l</b>                        | <b>ug/l</b>                        |                 |
| 07879                | Ethylene dibromide          | 106-93-4             | < 0.030              | 0.030                              | 0.0098                             | 1               |
| <b>Metals</b>        | <b>SW-846 6010B</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 01743                | Aluminum                    | 7429-90-5            | 0.217                | 0.200                              | 0.0834                             | 1               |
| 07044                | Antimony                    | 7440-36-0            | < 0.0200             | 0.0200                             | 0.0100                             | 1               |
| 07035                | Arsenic                     | 7440-38-2            | < 0.0200             | 0.0200                             | 0.0098                             | 1               |
| 07046                | Barium                      | 7440-39-3            | 0.124                | 0.0050                             | 0.00060                            | 1               |
| 07047                | Beryllium                   | 7440-41-7            | < 0.0050             | 0.0050                             | 0.0014                             | 1               |
| 07049                | Cadmium                     | 7440-43-9            | < 0.0050             | 0.0050                             | 0.0020                             | 1               |
| 01750                | Calcium                     | 7440-70-2            | 110                  | 0.200                              | 0.0702                             | 1               |
| 07051                | Chromium                    | 7440-47-3            | < 0.0150             | 0.0150                             | 0.0034                             | 1               |
| 07052                | Cobalt                      | 7440-48-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 07053                | Copper                      | 7440-50-8            | < 0.0100             | 0.0100                             | 0.0027                             | 1               |
| 01754                | Iron                        | 7439-89-6            | 1.47                 | 0.200                              | 0.0522                             | 1               |
| 07055                | Lead                        | 7439-92-1            | < 0.0150             | 0.0150                             | 0.0069                             | 1               |
| 01757                | Magnesium                   | 7439-95-4            | 69.6                 | 0.100                              | 0.0172                             | 1               |
| 07058                | Manganese                   | 7439-96-5            | 0.304                | 0.0050                             | 0.00084                            | 1               |
| 07061                | Nickel                      | 7440-02-0            | < 0.0100             | 0.0100                             | 0.0030                             | 1               |
| 01762                | Potassium                   | 7440-09-7            | 10.4                 | 0.500                              | 0.239                              | 1               |
| 07036                | Selenium                    | 7782-49-2            | < 0.0200             | 0.0200                             | 0.0089                             | 1               |
| 07066                | Silver                      | 7440-22-4            | < 0.0050             | 0.0050                             | 0.0023                             | 1               |
| 01767                | Sodium                      | 7440-23-5            | 17.1                 | 1.00                               | 0.433                              | 1               |
| 07022                | Thallium                    | 7440-28-0            | < 0.0300             | 0.0300                             | 0.0140                             | 1               |
| 07071                | Vanadium                    | 7440-62-2            | < 0.0050             | 0.0050                             | 0.0025                             | 1               |
| 07072                | Zinc                        | 7440-66-6            | < 0.0200             | 0.0200                             | 0.0081                             | 1               |
|                      | <b>SW-846 7470A</b>         | <b>mg/l</b>          | <b>mg/l</b>          | <b>mg/l</b>                        |                                    |                 |
| 00259                | Mercury                     | 7439-97-6            | < 0.00020            | 0.00020                            | 0.000046                           | 1               |
| <b>Wet Chemistry</b> | <b>SM20 2340 C</b>          | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b> | <b>mg/l as CaCO3</b>               |                                    |                 |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-5\_040711 Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-5\_040711

**LLI Sample #** WW 6253872  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

SWS05

| CAT No.              | Analysis Name  | CAS Number  | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|----------------------|----------------|-------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Wet Chemistry</b> |                |             |                    |                                    |                                    |                 |
| 00216                | Total Hardness | SM20 2340 C | mg/l as CaCO3      | mg/l as CaCO3                      | mg/l as CaCO3                      |                 |
|                      |                | 471-34-1    | 586                | 15.0                               | 5.0                                | 5               |

### General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 10943   | BTEX/MTBE/Cumene/EDC/TMBs     | SW-846 8260B | 1      | F111023AA    | 04/13/2011 02:54       | Kelly E Keller    | 1               |
| 01163   | GC/MS VOA Water Prep          | SW-846 5030B | 1      | F111023AA    | 04/13/2011 02:54       | Kelly E Keller    | 1               |
| 07805   | PAHs by 8270                  | SW-846 8270C | 1      | 11103WAB026  | 04/14/2011 11:58       | Joseph M Gambler  | 1               |
| 07807   | BNA Water Extraction          | SW-846 3510C | 1      | 11103WAB026  | 04/13/2011 13:30       | Olivia I Santiago | 1               |
| 07879   | EDB in Wastewater             | SW-846 8011  | 1      | 111030009A   | 04/15/2011 04:05       | James H Place     | 1               |
| 07786   | EDB Extraction                | SW-846 8011  | 1      | 111030009A   | 04/13/2011 14:00       | Kelli M Barto     | 1               |
| 01743   | Aluminum                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07044   | Antimony                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07035   | Arsenic                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07046   | Barium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07047   | Beryllium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07049   | Cadmium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 01750   | Calcium                       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07051   | Chromium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07052   | Cobalt                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07053   | Copper                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 18:07       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:33       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:15       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |
| 00216   | Total Hardness                | SM20 2340 C  | 1      | 11102021602B | 04/12/2011 14:10       | Susan A Engle     | 5               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-5\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-5\_040711

**LLI Sample #** WW 6253873  
**LLI Group #** 1241314  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/08/2011 14:10

West Chester PA 19381

**Reported:** 04/19/2011 11:17

| CAT No.                 | Analysis Name | CAS Number          | As Received Result | As Received Limit of Quantitation* | As Received Method Detection Limit | Dilution Factor |
|-------------------------|---------------|---------------------|--------------------|------------------------------------|------------------------------------|-----------------|
| <b>Metals Dissolved</b> |               | <b>SW-846 6010B</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 01743                   | Aluminum      | 7429-90-5           | < 0.200            | 0.200                              | 0.0834                             | 1               |
| 07044                   | Antimony      | 7440-36-0           | < 0.0200           | 0.0200                             | 0.0100                             | 1               |
| 07035                   | Arsenic       | 7440-38-2           | < 0.0200           | 0.0200                             | 0.0098                             | 1               |
| 07046                   | Barium        | 7440-39-3           | 0.111              | 0.0050                             | 0.00060                            | 1               |
| 07047                   | Beryllium     | 7440-41-7           | < 0.0050           | 0.0050                             | 0.0014                             | 1               |
| 07049                   | Cadmium       | 7440-43-9           | < 0.0050           | 0.0050                             | 0.0020                             | 1               |
| 01750                   | Calcium       | 7440-70-2           | 109                | 0.200                              | 0.0702                             | 1               |
| 07051                   | Chromium      | 7440-47-3           | < 0.0150           | 0.0150                             | 0.0034                             | 1               |
| 07052                   | Cobalt        | 7440-48-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 07053                   | Copper        | 7440-50-8           | < 0.0100           | 0.0100                             | 0.0027                             | 1               |
| 01754                   | Iron          | 7439-89-6           | < 0.200            | 0.200                              | 0.0522                             | 1               |
| 07055                   | Lead          | 7439-92-1           | < 0.0150           | 0.0150                             | 0.0069                             | 1               |
| 01757                   | Magnesium     | 7439-95-4           | 70.4               | 0.100                              | 0.0172                             | 1               |
| 07058                   | Manganese     | 7439-96-5           | 0.0943             | 0.0050                             | 0.00084                            | 1               |
| 07061                   | Nickel        | 7440-02-0           | < 0.0100           | 0.0100                             | 0.0030                             | 1               |
| 01762                   | Potassium     | 7440-09-7           | 10.3               | 0.500                              | 0.239                              | 1               |
| 07036                   | Selenium      | 7782-49-2           | < 0.0200           | 0.0200                             | 0.0089                             | 1               |
| 07066                   | Silver        | 7440-22-4           | < 0.0050           | 0.0050                             | 0.0023                             | 1               |
| 01767                   | Sodium        | 7440-23-5           | 17.3               | 1.00                               | 0.433                              | 1               |
| 07022                   | Thallium      | 7440-28-0           | < 0.0300           | 0.0300                             | 0.0140                             | 1               |
| 07071                   | Vanadium      | 7440-62-2           | < 0.0050           | 0.0050                             | 0.0025                             | 1               |
| 07072                   | Zinc          | 7440-66-6           | < 0.0200           | 0.0200                             | 0.0081                             | 1               |
|                         |               | <b>SW-846 7470A</b> | <b>mg/l</b>        | <b>mg/l</b>                        | <b>mg/l</b>                        |                 |
| 00259                   | Mercury       | 7439-97-6           | < 0.00020          | 0.00020                            | 0.000046                           | 1               |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12  
This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|---------------|--------------|--------|--------------|------------------------|-----------------|-----------------|
| 01743   | Aluminum      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07044   | Antimony      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07035   | Arsenic       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07046   | Barium        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07047   | Beryllium     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07049   | Cadmium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 01750   | Calcium       | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07051   | Chromium      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07052   | Cobalt        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |
| 07053   | Copper        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** SWS-5\_040711 Filtered Grab Water  
Philadelphia Refinery AOI-10  
COC: 258225 SWS-5\_040711

LLI Sample # WW 6253873  
LLI Group # 1241314  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/19/2011 11:17

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 01754   | Iron                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07055   | Lead                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 01757   | Magnesium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07058   | Manganese                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07061   | Nickel                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 01762   | Potassium                     | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07036   | Selenium                      | SW-846 6010B | 1      | 111011848005 | 04/18/2011 18:10       | John P Hook       | 1               |
| 07066   | Silver                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 01767   | Sodium                        | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07022   | Thallium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07071   | Vanadium                      | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 07072   | Zinc                          | SW-846 6010B | 1      | 111011848005 | 04/17/2011 09:44       | Damary Valentin   | 1               |
| 00259   | Mercury                       | SW-846 7470A | 1      | 111025713002 | 04/12/2011 20:16       | Nelli S Markaryan | 1               |
| 01848   | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1      | 111011848005 | 04/11/2011 19:40       | Mirit S Shenouda  | 1               |
| 05713   | WW SW846 Hg Digest            | SW-846 7470A | 1      | 111025713002 | 04/12/2011 15:30       | Nelli S Markaryan | 1               |



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/19/11 at 11:17 AM

Group Number: 1241314

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                                 | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---------------------------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: F111023AA                                       |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 |              |             |           |              |          |           |                 |     |         |
| Benzene                                                       | < 1          | 1.          | 0.5       | ug/l         | 101      |           | 79-120          |     |         |
| 1,2-Dichloroethane                                            | < 1          | 1.          | 0.5       | ug/l         | 97       |           | 70-130          |     |         |
| Ethylbenzene                                                  | < 1          | 1.          | 0.5       | ug/l         | 101      |           | 79-120          |     |         |
| Isopropylbenzene                                              | < 2          | 2.          | 0.5       | ug/l         | 100      |           | 77-120          |     |         |
| Methyl Tertiary Butyl Ether                                   | < 1          | 1.          | 0.5       | ug/l         | 93       |           | 76-120          |     |         |
| Toluene                                                       | < 1          | 1.          | 0.5       | ug/l         | 100      |           | 79-120          |     |         |
| 1,2,4-Trimethylbenzene                                        | < 2          | 2.          | 0.5       | ug/l         | 104      |           | 74-120          |     |         |
| 1,3,5-Trimethylbenzene                                        | < 2          | 2.          | 0.5       | ug/l         | 105      |           | 75-120          |     |         |
| Xylene (Total)                                                | < 1          | 1.          | 0.5       | ug/l         | 96       |           | 80-120          |     |         |
| Batch number: 11103WAB026                                     |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 |              |             |           |              |          |           |                 |     |         |
| Chrysene                                                      | < 5          | 5.          | 1         | ug/l         | 97       | 102       | 82-112          | 5   | 30      |
| Fluorene                                                      | < 5          | 5.          | 1         | ug/l         | 96       | 94        | 82-113          | 2   | 30      |
| Naphthalene                                                   | < 5          | 5.          | 1         | ug/l         | 93       | 93        | 77-107          | 0   | 30      |
| Phenanthrene                                                  | < 5          | 5.          | 1         | ug/l         | 95       | 96        | 83-112          | 2   | 30      |
| Pyrene                                                        | < 5          | 5.          | 1         | ug/l         | 100      | 104       | 80-115          | 3   | 30      |
| Batch number: 111030009A                                      |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 |              |             |           |              |          |           |                 |     |         |
| Ethylene dibromide                                            | < 0.030      | 0.030       | 0.010     | ug/l         | 96       | 96        | 60-140          | 0   | 20      |
| Batch number: 111011848005                                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6253864-6253873                             |              |             |           |              |          |           |                 |     |         |
| Aluminum                                                      | < 0.200      | 0.200       | 0.0834    | mg/l         | 94       |           | 90-112          |     |         |
| Antimony                                                      | < 0.0200     | 0.0200      | 0.0100    | mg/l         | 103      |           | 88-111          |     |         |
| Arsenic                                                       | < 0.0200     | 0.0200      | 0.0098    | mg/l         | 102      |           | 89-115          |     |         |
| Barium                                                        | < 0.0050     | 0.0050      | 0.00060   | mg/l         | 101      |           | 90-110          |     |         |
| Beryllium                                                     | < 0.0050     | 0.0050      | 0.0014    | mg/l         | 97       |           | 88-110          |     |         |
| Cadmium                                                       | < 0.0050     | 0.0050      | 0.0020    | mg/l         | 99       |           | 90-112          |     |         |
| Calcium                                                       | < 0.200      | 0.200       | 0.0702    | mg/l         | 102      |           | 90-112          |     |         |
| Chromium                                                      | < 0.0150     | 0.0150      | 0.0034    | mg/l         | 99       |           | 90-110          |     |         |
| Cobalt                                                        | < 0.0050     | 0.0050      | 0.0023    | mg/l         | 102      |           | 90-110          |     |         |
| Copper                                                        | < 0.0100     | 0.0100      | 0.0027    | mg/l         | 101      |           | 90-112          |     |         |
| Iron                                                          | < 0.200      | 0.200       | 0.0522    | mg/l         | 103      |           | 90-112          |     |         |
| Lead                                                          | < 0.0150     | 0.0150      | 0.0069    | mg/l         | 101      |           | 88-110          |     |         |
| Magnesium                                                     | < 0.100      | 0.100       | 0.0172    | mg/l         | 102      |           | 89-110          |     |         |
| Manganese                                                     | < 0.0050     | 0.0050      | 0.00084   | mg/l         | 101      |           | 90-110          |     |         |
| Nickel                                                        | < 0.0100     | 0.0100      | 0.0030    | mg/l         | 103      |           | 90-111          |     |         |
| Potassium                                                     | < 0.500      | 0.500       | 0.239     | mg/l         | 101      |           | 85-115          |     |         |
| Selenium                                                      | < 0.0200     | 0.0200      | 0.0089    | mg/l         | 96       |           | 80-120          |     |         |
| Silver                                                        | < 0.0050     | 0.0050      | 0.0023    | mg/l         | 104      |           | 83-120          |     |         |
| Sodium                                                        | < 1.00       | 1.00        | 0.433     | mg/l         | 101      |           | 87-114          |     |         |
| Thallium                                                      | < 0.0300     | 0.0300      | 0.0140    | mg/l         | 122*     |           | 85-113          |     |         |
| Vanadium                                                      | < 0.0050     | 0.0050      | 0.0025    | mg/l         | 101      |           | 90-110          |     |         |
| Zinc                                                          | < 0.0200     | 0.0200      | 0.0081    | mg/l         | 96       |           | 90-111          |     |         |
| Batch number: 111025713002                                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6253864-6253873                             |              |             |           |              |          |           |                 |     |         |
| Mercury                                                       | < 0.00020    | 0.00020     | 0.00004   | mg/l         | 99       |           | 80-120          |     |         |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/19/11 at 11:17 AM

Group Number: 1241314

| <u>Analysis Name</u>       | <u>Blank<br/>Result</u>                                       | <u>Blank<br/>LOQ**</u> | <u>Blank<br/>MDL</u> | <u>Report<br/>Units</u>      | <u>LCS<br/>%REC</u> | <u>LCSD<br/>%REC</u> | <u>LCS/LCSD<br/>Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------------|---------------------------------------------------------------|------------------------|----------------------|------------------------------|---------------------|----------------------|----------------------------|------------|----------------|
|                            |                                                               |                        | 6                    |                              |                     |                      |                            |            |                |
| Batch number: 11102021602B | Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 |                        |                      |                              |                     |                      |                            |            |                |
| Total Hardness             | < 3.0                                                         | 3.0                    | 1.0                  | mg/l as<br>CaCO <sub>3</sub> | 100                 |                      | 98-105                     |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS<br/>%REC</u>                                                           | <u>MSD<br/>%REC</u> | <u>MS/MSD<br/>Limits</u> | <u>RPD</u> | <u>RPD<br/>MAX</u> | <u>BKG<br/>Conc</u> | <u>DUP<br/>Conc</u> | <u>DUP<br/>RPD</u> | <u>Dup RPD<br/>Max</u> |
|-----------------------------|------------------------------------------------------------------------------|---------------------|--------------------------|------------|--------------------|---------------------|---------------------|--------------------|------------------------|
| Batch number: F111023AA     | Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 UNSPK: P253314 |                     |                          |            |                    |                     |                     |                    |                        |
| Benzene                     | 110                                                                          | 106                 | 80-126                   | 4          | 30                 |                     |                     |                    |                        |
| 1,2-Dichloroethane          | 102                                                                          | 100                 | 66-141                   | 2          | 30                 |                     |                     |                    |                        |
| Ethylbenzene                | 108                                                                          | 110                 | 71-134                   | 1          | 30                 |                     |                     |                    |                        |
| Isopropylbenzene            | 109                                                                          | 110                 | 75-128                   | 1          | 30                 |                     |                     |                    |                        |
| Methyl Tertiary Butyl Ether | 101                                                                          | 98                  | 72-126                   | 2          | 30                 |                     |                     |                    |                        |
| Toluene                     | 107                                                                          | 106                 | 80-125                   | 1          | 30                 |                     |                     |                    |                        |
| 1,2,4-Trimethylbenzene      | 110                                                                          | 108                 | 72-130                   | 1          | 30                 |                     |                     |                    |                        |
| 1,3,5-Trimethylbenzene      | 112                                                                          | 112                 | 72-131                   | 1          | 30                 |                     |                     |                    |                        |
| Xylene (Total)              | 102                                                                          | 101                 | 79-125                   | 1          | 30                 |                     |                     |                    |                        |
| Batch number: 111030009A    | Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 UNSPK: P250619 |                     |                          |            |                    |                     |                     |                    |                        |
| Ethylene dibromide          | 96                                                                           | 83                  | 65-135                   | 10         | 20                 |                     |                     |                    |                        |
| Batch number: 111011848005  | Sample number(s): 6253864-6253873 UNSPK: P253821 BKG: P253821                |                     |                          |            |                    |                     |                     |                    |                        |
| Aluminum                    | 96                                                                           | 96                  | 75-125                   | 1          | 20                 | < 0.200             | < 0.200             | 0 (1)              | 20                     |
| Antimony                    | 105                                                                          | 105                 | 87-122                   | 0          | 20                 | < 0.0200            | < 0.0200            | 0 (1)              | 20                     |
| Arsenic                     | 104                                                                          | 106                 | 75-125                   | 2          | 20                 | < 0.0200            | < 0.0200            | 0 (1)              | 20                     |
| Barium                      | 99                                                                           | 101                 | 78-118                   | 2          | 20                 | 0.0713              | 0.0691              | 3                  | 20                     |
| Beryllium                   | 98                                                                           | 99                  | 87-114                   | 1          | 20                 | < 0.0050            | < 0.0050            | 0 (1)              | 20                     |
| Cadmium                     | 96                                                                           | 96                  | 83-116                   | 0          | 20                 | < 0.0050            | < 0.0050            | 0 (1)              | 20                     |
| Calcium                     | 100 (2)                                                                      | 76 (2)              | 81-118                   | 2          | 20                 | 48.3                | 47.5                | 2                  | 20                     |
| Chromium                    | 98                                                                           | 98                  | 81-120                   | 1          | 20                 | < 0.0150            | < 0.0150            | 0 (1)              | 20                     |
| Cobalt                      | 97                                                                           | 98                  | 87-112                   | 0          | 20                 | < 0.0050            | < 0.0050            | 2 (1)              | 20                     |
| Copper                      | 101                                                                          | 101                 | 86-122                   | 1          | 20                 | < 0.0100            | < 0.0100            | 0 (1)              | 20                     |
| Iron                        | 100                                                                          | 101                 | 75-125                   | 0          | 20                 | < 0.200             | < 0.200             | 5 (1)              | 20                     |
| Lead                        | 96                                                                           | 95                  | 75-125                   | 1          | 20                 | < 0.0150            | < 0.0150            | 0 (1)              | 20                     |
| Magnesium                   | 109 (2)                                                                      | 71 (2)              | 75-125                   | 2          | 20                 | 37.0                | 36.3                | 2                  | 20                     |
| Manganese                   | 95 (2)                                                                       | 90 (2)              | 75-125                   | 1          | 20                 | 3.00                | 2.93                | 2                  | 20                     |
| Nickel                      | 99                                                                           | 99                  | 86-115                   | 0          | 20                 | < 0.0100            | < 0.0100            | 5 (1)              | 20                     |
| Potassium                   | 101                                                                          | 100                 | 83-123                   | 0          | 20                 | 6.88                | 6.76                | 2                  | 20                     |
| Selenium                    | 84                                                                           | 91                  | 75-125                   | 8          | 20                 | < 0.100             | < 0.100             | 200* (1)           | 20                     |
| Silver                      | 104                                                                          | 105                 | 75-125                   | 1          | 20                 | < 0.0050            | < 0.0050            | 0 (1)              | 20                     |
| Sodium                      | 68 (2)                                                                       | 82 (2)              | 75-125                   | 1          | 20                 | 87.1                | 84.7                | 3                  | 20                     |
| Thallium                    | 113                                                                          | 114                 | 83-116                   | 0          | 20                 | < 0.0300            | < 0.0300            | 0 (1)              | 20                     |
| Vanadium                    | 101                                                                          | 102                 | 90-111                   | 1          | 20                 | < 0.0050            | < 0.0050            | 0 (1)              | 20                     |
| Zinc                        | 95                                                                           | 95                  | 85-117                   | 0          | 20                 | < 0.0200            | < 0.0200            | 0 (1)              | 20                     |
| Batch number: 111025713002  | Sample number(s): 6253864-6253873 UNSPK: 6253867 BKG: 6253867                |                     |                          |            |                    |                     |                     |                    |                        |
| Mercury                     | 103                                                                          | 101                 | 80-120                   | 2          | 20                 | < 0.00020           | < 0.00020           | 0 (1)              | 20                     |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/19/11 at 11:17 AM

Group Number: 1241314

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>       | <u>MS</u><br><u>%REC</u>                                                                  | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|----------------------------|-------------------------------------------------------------------------------------------|---------------------------|--------------------------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Batch number: 11102021602B | Sample number(s): 6253864, 6253866, 6253868, 6253870, 6253872 UNSPK: P252938 BKG: 6253872 |                           |                                |                          |                           |                           |                          |                              |
| Total Hardness             | 104                                                                                       |                           | 92-109                         |                          | 586                       | 581                       | 1                        | 5                            |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: UST BTEX, MTBE in Water

Batch number: F111023AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6253864 | 101                  | 99                    | 102        | 97                   |
| 6253866 | 100                  | 99                    | 103        | 99                   |
| 6253868 | 101                  | 97                    | 102        | 99                   |
| 6253870 | 104                  | 101                   | 102        | 99                   |
| 6253872 | 100                  | 98                    | 102        | 98                   |
| Blank   | 103                  | 100                   | 101        | 99                   |
| LCS     | 102                  | 101                   | 101        | 103                  |
| MS      | 103                  | 102                   | 101        | 102                  |
| MSD     | 102                  | 101                   | 103        | 103                  |
| Limits: | 80-116               | 77-113                | 80-113     | 78-113               |

Analysis Name: PAHs by 8270

Batch number: 11103WAB026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6253864 | 90              | 96               | 92            |
| 6253866 | 87              | 94               | 85            |
| 6253868 | 85              | 93               | 88            |
| 6253870 | 89              | 97               | 87            |
| 6253872 | 90              | 98               | 91            |
| Blank   | 84              | 92               | 96            |
| LCS     | 84              | 99               | 94            |
| LCSD    | 85              | 95               | 96            |
| Limits: | 52-120          | 63-114           | 34-118        |

Analysis Name: EDB in Wastewater

Batch number: 111030009A

|         | 1,1,2,2-Tetrachloroethane |
|---------|---------------------------|
| 6253864 | 78                        |
| 6253866 | 75                        |
| 6253868 | 86                        |
| 6253870 | 81                        |
| 6253872 | 76                        |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/19/11 at 11:17 AM

Group Number: 1241314

### Surrogate Quality Control

|       |    |
|-------|----|
| Blank | 91 |
| LCS   | 91 |
| LCSD  | 93 |
| MS    | 93 |
| MSD   | 84 |

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Limits: 46-136

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



**Lancaster  
Laboratories**

Acct. # 10132 Group# 1241314 Sample # 6253864-73 **COC #** 258225

0.8-5.2%

|                                                                                                                                                                                                                                                                                                           |  |      |      |              |  |                                                                                                       |                |                                                   |                  |               |              |              |          |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|------|--------------|--|-------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------|------------------|---------------|--------------|--------------|----------|------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| <b>1</b><br>Client: <u>SUN-AQUATERRA</u> Acct. #: _____<br>Project Name/#: <u>PHILAREF AOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O.#: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                     |  |      |      |              |  | <b>Matrix</b><br>Check if Potable<br><input type="checkbox"/> NPDES<br><input type="checkbox"/> Other |                | <b>5 Analyses Requested</b><br>Preservation Codes |                  |               |              |              |          |                              |                                  | For Lab Use Only<br>FSC: _____<br>SCR#: <u>103730</u>                                                                     |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                           |  |      |      |              |  |                                                                                                       |                |                                                   |                  |               |              |              |          |                              |                                  | <b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |  |  |  |  |  |  |
| <b>2</b><br><b>Sample Identification</b>                                                                                                                                                                                                                                                                  |  |      |      |              |  | Date Collected                                                                                        | Time Collected | <b>3</b>                                          | <b>Composite</b> | <b>Soil</b>   | <b>Water</b> | <b>Other</b> | <b>4</b> | <b>Total # of Containers</b> | <b>Remarks</b>                   |                                                                                                                           |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                           |  |      |      |              |  |                                                                                                       |                |                                                   |                  |               |              |              |          |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| SWS-1 - 040711                                                                                                                                                                                                                                                                                            |  |      |      |              |  | 4/7/11                                                                                                | 1330           | X                                                 |                  |               | X            |              | 10       | X                            | * See attached list for analyses |                                                                                                                           |  |  |  |  |  |  |
| SWS-2 - 040711                                                                                                                                                                                                                                                                                            |  |      |      |              |  | 4/7/11                                                                                                | 1250           | X                                                 |                  | X             |              | 10           | X        |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| SWS-3 - 040711                                                                                                                                                                                                                                                                                            |  |      |      |              |  | 4/7/11                                                                                                | 1140           | X                                                 |                  | X             |              | 10           | X        |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| SWS-4 - 040711                                                                                                                                                                                                                                                                                            |  |      |      |              |  | 4/7/11                                                                                                | 1045           | X                                                 |                  | X             |              | 10           | X        |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| SWS-5 - 040711                                                                                                                                                                                                                                                                                            |  |      |      |              |  | 4/7/11                                                                                                | 1000           | X                                                 |                  | X             |              | 10           | X        |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| <b>7 Turnaround Time Requested (TAT) (please circle):</b> Normal Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |  |      |      |              |  | Relinquished by:                                                                                      |                | Date                                              | Time             | Received by:  |              | Date         | Time     | <b>9</b>                     |                                  |                                                                                                                           |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                           |  |      |      |              |  | Relinquished by:                                                                                      |                | Date                                              | Time             | Received by:  |              | Date         | Time     |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| Relinquished by:                                                                                                                                                                                                                                                                                          |  | Date | Time | Received by: |  | Date                                                                                                  | Time           |                                                   |                  |               |              |              |          |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| Relinquished by:                                                                                                                                                                                                                                                                                          |  | Date | Time | Received by: |  | Date                                                                                                  | Time           |                                                   |                  |               |              |              |          |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| Relinquished by:                                                                                                                                                                                                                                                                                          |  | Date | Time | Received by: |  | Date                                                                                                  | Time           |                                                   |                  |               |              |              |          |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
| <b>8 Data Package Options</b> (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No<br>Type IV (CLP SOW) Internal COC Required? Yes / No<br>Type VI (Raw Data Only)                      |  |      |      |              |  | SDG Complete?                                                                                         |                | Yes No                                            |                  | Sample Fridge |              | Date         | Time     |                              |                                  |                                                                                                                           |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                           |  |      |      |              |  | SDG Complete?                                                                                         |                | Yes No                                            |                  | Sample Fridge |              | Date         | Time     |                              |                                  |                                                                                                                           |  |  |  |  |  |  |



10132/1241314/6253864-73  
0.8-5.2<sup>oc</sup>

**Table 1c**  
**Constituents of Concern for Surface Water**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane                | 107-06-2       |
| 1,2,4-Trimethylbenzene            | 95-63-6        |
| 1,3,5-Trimethylbenzene            | 108-67-8       |
| Benzene                           | 71-43-2        |
| Cumene                            | 98-82-8        |
| Ethylbenzene                      | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether       | 1634-04-4      |
| Toluene                           | 108-88-3       |
| Xylenes (total)                   | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Chrysene                               | 218-01-9       |
| Fluorene                               | 86-73-7        |
| Naphthalene                            | 91-20-3        |
| Phenanthrene                           | 85-01-8        |
| Pyrene                                 | 129-00-0       |

| <b>TOTAL AND DISSOLVED TAL METALS</b> | <b>CAS No.</b> |
|---------------------------------------|----------------|
| Aluminum                              | 7429-90-5      |
| Antimony                              | 7440-36-0      |
| Arsenic                               | 7440-38-2      |
| Barium                                | 7440-39-3      |
| Beryllium                             | 7440-41-7      |
| Cadmium                               | 7440-43-9      |
| Calcium                               | 7440-70-2      |
| Chromium                              | 7440-47-3      |
| Cobalt                                | 7440-48-4      |
| Copper                                | 7440-50-8      |
| Iron                                  | 7439-89-6      |
| Lead (total)                          | 7439-92-1      |
| Magnesium                             | 7439-95-4      |
| Manganese                             | 7439-96-5      |
| Mercury                               | 7439-97-6      |
| Nickel                                | 7440-02-0      |
| Potassium                             | 9777440        |
| Selenium                              | 7782-49-2      |
| Silver                                | 7440-22-4      |
| Sodium                                | 7440-23-5      |
| Thallium                              | 7440-28-0      |
| Vanadium                              | 7440-62-2      |
| Zinc                                  | 7440-66-6      |
| <b>Additional Analysis</b>            |                |
| Hardness                              |                |

**Notes:**

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 15, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/08/2011  
Group Number: 1241313  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample Description

W-32D\_0-2' Grab Soil

Lancaster Labs (LLI) #

6253863

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

|                    |                      |                         |
|--------------------|----------------------|-------------------------|
| ELECTRONIC COPY TO | Langan               | Attn: Dennis Webster    |
| ELECTRONIC COPY TO | SUN: Aquaterra Tech. | Attn: Tiffani Doerr     |
| ELECTRONIC COPY TO | LLI                  | Attn: EDD Group         |
| ELECTRONIC COPY TO | Langan               | Attn: Kristen Ward      |
| ELECTRONIC COPY TO | Aquaterra Tech       | Attn: Loretta Belfiglio |

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Matthew E. Barton  
Senior Specialist



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 2

**Sample Description:** W-32D\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 255058 W-32D\_0-2'

**LLI Sample #** SW 6253863  
**LLI Group #** 1241313  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/08/2011 14:10

PO Box 744

**Reported:** 04/15/2011 09:35

West Chester PA 19381

W-32D

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit* | Dry Limit of Quantitation | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|-----------------------------|---------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>                | <b>ug/kg</b>              |                 |
| 10950        | Benzene                     | 71-43-2             | 3 J          | 0.7                         | 7                         | 1.01            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | Ethylbenzene                | 100-41-4            | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.7                         | 7                         | 1.01            |
| 10950        | Toluene                     | 108-88-3            | 2 J          | 1                           | 7                         | 1.01            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.         | 1                           | 7                         | 1.01            |
| 10950        | Xylene (Total)              | 1330-20-7           | N.D.         | 1                           | 7                         | 1.01            |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | N.D.         | 240          | 1,200        | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 350 J        | 240          | 1,200        | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 430 J        | 240          | 1,200        | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 440 J        | 240          | 1,200        | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 680 J        | 240          | 1,200        | 5 |
| 10724        | Chrysene             | 218-01-9            | 440 J        | 240          | 1,200        | 5 |
| 10724        | Fluorene             | 86-73-7             | N.D.         | 240          | 1,200        | 5 |
| 10724        | Naphthalene          | 91-20-3             | N.D.         | 240          | 1,200        | 5 |
| 10724        | Phenanthrene         | 85-01-8             | 420 J        | 240          | 1,200        | 5 |
| 10724        | Pyrene               | 129-00-0            | 520 J        | 240          | 1,200        | 5 |

Reporting limits were raised due to interference from the sample matrix.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 1,200        | 0.181        | 3.49         | 25 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 29.7     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111021AA | 04/12/2011 09:19       | Stephanie A Selis | 1.01            |

\*=This limit was used in the evaluation of the final result



**Sample Description:** W-32D\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 255058 W-32D\_0-2'

LLI Sample # SW 6253863  
LLI Group # 1241313  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/07/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/08/2011 14:10

West Chester PA 19381

Reported: 04/15/2011 09:35

W-32D

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109824067  | 04/07/2011 13:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109824067  | 04/07/2011 13:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109824067  | 04/07/2011 13:00       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 11:23       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:25       | David K Beck         | 25              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11103820003A  | 04/13/2011 20:31       | Scott W Freisher     | 1               |

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 09:35 AM

Group Number: 1241313

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name               | Blank Result              | Blank MDL** | Blank LOQ | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|-----------------------------|---------------------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: X111021AA     | Sample number(s): 6253863 |             |           |              |          |           |                 |     |         |
| Benzene                     | N.D.                      | 0.5         | 5         | ug/kg        | 100      | 98        | 80-120          | 3   | 30      |
| 1,2-Dibromoethane           | N.D.                      | 1.          | 5         | ug/kg        | 89       | 100       | 80-120          | 12  | 30      |
| 1,2-Dichloroethane          | N.D.                      | 1.          | 5         | ug/kg        | 92       | 94        | 71-129          | 2   | 30      |
| Ethylbenzene                | N.D.                      | 1.          | 5         | ug/kg        | 99       | 97        | 80-120          | 2   | 30      |
| Isopropylbenzene            | N.D.                      | 1.          | 5         | ug/kg        | 98       | 96        | 76-120          | 3   | 30      |
| Methyl Tertiary Butyl Ether | N.D.                      | 0.5         | 5         | ug/kg        | 82       | 90        | 74-121          | 9   | 30      |
| Toluene                     | N.D.                      | 1.          | 5         | ug/kg        | 101      | 99        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene      | N.D.                      | 1.          | 5         | ug/kg        | 103      | 101       | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene      | N.D.                      | 1.          | 5         | ug/kg        | 105      | 103       | 78-120          | 2   | 30      |
| Xylene (Total)              | N.D.                      | 1.          | 5         | ug/kg        | 98       | 97        | 80-120          | 1   | 30      |
| Batch number: 11102SLE026   | Sample number(s): 6253863 |             |           |              |          |           |                 |     |         |
| Anthracene                  | N.D.                      | 33.         | 170       | ug/kg        | 100      |           | 83-111          |     |         |
| Benzo(a)anthracene          | N.D.                      | 33.         | 170       | ug/kg        | 91       |           | 82-111          |     |         |
| Benzo(a)pyrene              | N.D.                      | 33.         | 170       | ug/kg        | 97       |           | 63-138          |     |         |
| Benzo(b)fluoranthene        | N.D.                      | 33.         | 170       | ug/kg        | 106      |           | 61-133          |     |         |
| Benzo(g,h,i)perylene        | N.D.                      | 33.         | 170       | ug/kg        | 104      |           | 63-130          |     |         |
| Chrysene                    | N.D.                      | 33.         | 170       | ug/kg        | 94       |           | 81-111          |     |         |
| Fluorene                    | N.D.                      | 33.         | 170       | ug/kg        | 98       |           | 81-117          |     |         |
| Naphthalene                 | N.D.                      | 33.         | 170       | ug/kg        | 91       |           | 83-112          |     |         |
| Phenanthrene                | N.D.                      | 33.         | 170       | ug/kg        | 98       |           | 83-109          |     |         |
| Pyrene                      | N.D.                      | 33.         | 170       | ug/kg        | 101      |           | 80-121          |     |         |
| Batch number: 111011026001A | Sample number(s): 6253863 |             |           |              |          |           |                 |     |         |
| Lead                        | N.D.                      | 0.0104      | 0.200     | mg/kg        | 100      |           | 83-110          |     |         |
| Batch number: 11103820003A  | Sample number(s): 6253863 |             |           |              |          |           |                 |     |         |
| Moisture                    |                           |             |           |              | 100      |           | 99-101          |     |         |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name             | MS %REC                                  | MSD %REC | MS/MSD Limits | RPD | RPD MAX | BKG Conc | DUP Conc | DUP RPD | Dup RPD Max |
|---------------------------|------------------------------------------|----------|---------------|-----|---------|----------|----------|---------|-------------|
| Batch number: 11102SLE026 | Sample number(s): 6253863 UNSPK: P250832 |          |               |     |         |          |          |         |             |
| Anthracene                | 264*                                     | 105      | 40-147        | 58* | 30      |          |          |         |             |
| Benzo(a)anthracene        | 435*                                     | 109      | 32-150        | 56* | 30      |          |          |         |             |
| Benzo(a)pyrene            | 389*                                     | 99       | 57-129        | 53* | 30      |          |          |         |             |
| Benzo(b)fluoranthene      | 342 (2)                                  | 114 (2)  | 53-131        | 34* | 30      |          |          |         |             |
| Benzo(g,h,i)perylene      | 229*                                     | 106      | 60-123        | 35* | 30      |          |          |         |             |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 09:35 AM

Group Number: 1241313

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS</u><br><u>%REC</u>                              | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup</u> <u>RPD</u><br><u>Max</u> |    |
|-----------------------------|-------------------------------------------------------|---------------------------|--------------------------------|--------------------------|---------------------------|---------------------------|--------------------------|-------------------------------------|----|
| Chrysene                    | 377*                                                  | 112                       | 76-114                         | 49*                      | 30                        |                           |                          |                                     |    |
| Fluorene                    | 181*                                                  | 97                        | 46-137                         | 47*                      | 30                        |                           |                          |                                     |    |
| Naphthalene                 | 210*                                                  | 96                        | 52-132                         | 56*                      | 30                        |                           |                          |                                     |    |
| Phenanthrene                | 787 (2)                                               | 161 (2)                   | 34-147                         | 71*                      | 30                        |                           |                          |                                     |    |
| Pyrene                      | 666 (2)                                               | 137 (2)                   | 76-124                         | 59*                      | 30                        |                           |                          |                                     |    |
| Batch number: 111011026001A | Sample number(s): 6253863 UNSPK: P252458 BKG: P252458 |                           |                                |                          |                           |                           |                          |                                     |    |
| Lead                        | 108                                                   | 101                       | 75-125                         | 2                        | 20                        | 4.06                      | 4.30                     | 6                                   | 20 |
| Batch number: 11103820003A  | Sample number(s): 6253863 BKG: P253875                |                           |                                |                          |                           |                           |                          |                                     |    |
| Moisture                    |                                                       |                           |                                |                          | 17.8                      | 17.6                      | 1                        | 15                                  |    |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)  
Batch number: X111021AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 6253863 | 89                   | 97                    | 103        | 93                   |
| Blank   | 96                   | 101                   | 98         | 101                  |
| LCS     | 92                   | 100                   | 109        | 103                  |
| LCSD    | 93                   | 102                   | 109        | 104                  |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: PAH 8270 (microwave)

Batch number: 11102SLE026

|         | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---------|-----------------|------------------|---------------|
| 6253863 | 87              | 88               | 82            |
| Blank   | 103             | 110              | 108           |
| LCS     | 101             | 110              | 103           |
| MS      | 97              | 104              | 90            |
| MSD     | 94              | 100              | 88            |
| Limits: | 55-121          | 56-121           | 43-124        |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



Lancaster  
Laboratories

Acct. # 10132 Group# 1241313 Sample # 6253863

**COC # 255058**

Please print. Instructions on reverse side correspond with circled numbers.

0.8-5.2%

|                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                       |  |                                                                                                                     |  |                                                                                                                     |  |                                                                                                                     |  |                                                                                                                     |  |   |  |                                 |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------|--|---|--|---------------------------------|--|
| <div>1 Client: SUN - AQUATERRA Acct. #: Project Name/ #: PHILA REF AOI-10 PWSID #: Project Manager: T. DOERR P.O. #: Sampler: S. SYKES Quote #: Name of state where samples were collected: PA</div>                                                                                                                                                                                                    |  |  |  |  |  |  |  |  |  | <div>Matrix</div> <div>4</div> <div>5 Analyses Requested</div> <div>Preservation Codes</div>                                                                                          |  | <div>For Lab Use Only</div> <div>FSC: SCR:</div>                                                                    |  |                                                                                                                     |  |                                                                                                                     |  |                                                                                                                     |  |   |  |                                 |  |
| <div>2</div> <div>Sample Identification</div> <div>Date Collected</div> <div>Time Collected</div> <div>3</div> <div>Grab</div> <div>Composite</div> <div>Soil</div> <div>Water</div> <div>Other</div> <div>4</div> <div>Total # of Containers</div> <div>5</div> <div>Analyses Requested</div> <div>Preservation Codes</div> <div>6</div> <div>Temperature of samples upon receipt (if requested)</div> |  |  |  |  |  |  |  |  |  | <div>Preservation Codes</div> <div>H=HCl T=Thiosulfate</div> <div>N=HNO3 B=NaOH</div> <div>S=H2SO4 O=Other</div>                                                                      |  | <div>Remarks</div>                                                                                                  |  |                                                                                                                     |  |                                                                                                                     |  |                                                                                                                     |  |   |  |                                 |  |
| W-32B-O-2'                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  | 4/7/11                                                                                                                                                                                |  | 1300                                                                                                                |  | X                                                                                                                   |  | X                                                                                                                   |  | F                                                                                                                   |  | A |  | See attached sheet for analyses |  |
| <div>7</div> <div>Turnaround Time Requested (TAT) (please circle): Normal Rush</div> <div>Rush TAT is subject to Lancaster Laboratories approval and surcharge.)</div> <div>Date results are needed:</div> <div>Rush results requested by (please circle): Phone Fax E-mail</div> <div>Phone #: Fax #: E-mail address:</div>                                                                            |  |  |  |  |  |  |  |  |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div>                                                                   |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  |   |  |                                 |  |
| <div>8</div> <div>Data Package Options (please circle if required)</div> <div>Type I (validation/NJ Reg)</div> <div>Type II (Tier II)</div> <div>Type III (Reduced NJ)</div> <div>Type IV (CLP SOW)</div> <div>Type VI (Raw Data Only)</div>                                                                                                                                                            |  |  |  |  |  |  |  |  |  | <div>SDG Complete?</div> <div>Yes No</div> <div>TX TRRP-13</div> <div>MA MCP CT RCP</div> <div>Site-specific QC (MS/MSD/Dup)? Yes No</div> <div>Internal COC Required? Yes / No</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  | <div>Relinquished by:</div> <div>Date</div> <div>Time</div> <div>Received by:</div> <div>Date</div> <div>Time</div> |  |   |  |                                 |  |

10132/1241313/6253863

0.8-5.2

★ Soil

**Table 1b**  
**Constituents of Concern for Soil**  
**AOI 10 Work Plan for Site Characterization**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| <b>METALS</b> | <b>CAS No.</b> |
|---------------|----------------|
| Lead (total)  | 7439-92-1      |

| <b>VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|-----------------------------------|----------------|
| 1,2-Dichloroethane *              | 107-06-2       |
| 1,2,4-Trimethylbenzene *          | 95-63-6        |
| 1,3,5-Trimethylbenzene *          | 108-67-8       |
| Benzene *                         | 71-43-2        |
| Cumene *                          | 98-82-8        |
| Ethylbenzene *                    | 100-41-4       |
| Ethylene dibromide                | 106-93-4       |
| Methyl tertiary butyl ether *     | 1634-04-4      |
| Toluene *                         | 108-88-3       |
| Xylenes (total) *                 | 1330-20-7      |

| <b>SEMI-VOLATILE ORGANIC COMPOUNDS</b> | <b>CAS No.</b> |
|----------------------------------------|----------------|
| Anthracene *                           | 120-12-7       |
| Benzo(a)anthracene *                   | 56-55-3        |
| Benzo (g,h,i) perylene *               | 191-24-2       |
| Benzo(a)pyrene *                       | 50-32-8        |
| Benzo(b)fluoranthene *                 | 205-99-2       |
| Chrysene *                             | 218-01-9       |
| Fluorene *                             | 86-73-7        |
| Naphthalene *                          | 91-20-3        |
| Phenanthrene *                         | 85-01-8        |
| Pyrene *                               | 129-00-0       |

**Notes:**

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.
2. Select soil samples to be collected within the CAMU and delineation soil samples will be analyzed for full TCL VOCs, TCL SVOCs, and TAL metals.



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

| Organic Qualifiers |                                                                           | Inorganic Qualifiers |                                                         |
|--------------------|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------|
| <b>A</b>           | TIC is a possible aldol-condensation product                              | <b>B</b>             | Value is $<$ CRDL, but $\geq$ IDL                       |
| <b>B</b>           | Analyte was also detected in the blank                                    | <b>E</b>             | Estimated due to interference                           |
| <b>C</b>           | Pesticide result confirmed by GC/MS                                       | <b>M</b>             | Duplicate injection precision not met                   |
| <b>D</b>           | Compound quantitated on a diluted sample                                  | <b>N</b>             | Spike sample not within control limits                  |
| <b>E</b>           | Concentration exceeds the calibration range of the instrument             | <b>S</b>             | Method of standard additions (MSA) used for calculation |
| <b>N</b>           | Presumptive evidence of a compound (TICs only)                            | <b>U</b>             | Compound was not detected                               |
| <b>P</b>           | Concentration difference between primary and confirmation columns $>25\%$ | <b>W</b>             | Post digestion spike out of control limits              |
| <b>U</b>           | Compound was not detected                                                 | <b>*</b>             | Duplicate analysis not within control limits            |
| <b>X,Y,Z</b>       | Defined in case narrative                                                 | <b>+</b>             | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

SUN: Aquaterra Tech.  
PO Box 744  
West Chester PA 19381

April 15, 2011

Project: SUN: Philadelphia Refinery AOI-10

Submittal Date: 04/06/2011  
Group Number: 1240830  
PO Number: PHILADELPHIA  
State of Sample Origin: PAClient Sample DescriptionBH-10-37\_0-2' Grab Soil  
BH-10-36\_0-2' Grab Soil  
BH-10-38\_0-2' Grab Soil  
BH-10-41\_0-2' Grab Soil  
BH-10-40\_0-2' Grab Soil  
BH-10-39\_0-2' Grab Soil  
BH-10-71\_0-2' Grab Soil  
BH-10-72\_0-2' Grab Soil  
BH-10-73\_0-2' Grab Soil  
W-1D\_0-2' Grab SoilLancaster Labs (LLI) #6250832  
6250833  
6250834  
6250835  
6250836  
6250837  
6250838  
6250839  
6250840  
6250841

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC      Langan  
COPY TO

Attn: Dennis Webster

ELECTRONIC      SUN: Aquaterra Tech.  
COPY TO

Attn: Tiffani Doerr

ELECTRONIC      LLI  
COPY TO

Attn: EDD Group

ELECTRONIC      Langan  
COPY TO

Attn: Kristen Ward

ELECTRONIC      Aquaterra Tech  
COPY TO

Attn: Loretta Belfiglio

Questions? Contact your Client Services Representative  
Jessica A Oknefski at (717) 656-2300 Ext. 1815

Respectfully Submitted,



Christine Dulaney  
Senior Specialist



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 2

**Sample Description:** BH-10-37\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-37

LLI Sample # SW 6250832  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 09:15 by SS

SUN: Aquaterra Tech.

Submitted: 04/06/2011 16:15

PO Box 744

Reported: 04/15/2011 13:54

West Chester PA 19381

10A37

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 8            | 6                          | 0.6                        | 0.93            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.93            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.93            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.93            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.93            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.93            |
| 10950        | Toluene                     | 108-88-3            | < 6          | 6                          | 1                          | 0.93            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 6          | 6                          | 1                          | 0.93            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 6          | 6                          | 1                          | 0.93            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 6          | 6                          | 1                          | 0.93            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 1,900        | 1,100        | 210          | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 6,500        | 1,100        | 210          | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 6,500        | 1,100        | 210          | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 9,300        | 1,100        | 210          | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 3,900        | 1,100        | 210          | 5 |
| 10724        | Chrysene             | 218-01-9            | 6,200        | 1,100        | 210          | 5 |
| 10724        | Fluorene             | 86-73-7             | < 1,100      | 1,100        | 210          | 5 |
| 10724        | Naphthalene          | 91-20-3             | 1,100        | 1,100        | 210          | 5 |
| 10724        | Phenanthrene         | 85-01-8             | 8,600        | 1,100        | 210          | 5 |
| 10724        | Pyrene               | 129-00-0            | 10,000       | 1,100        | 210          | 5 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 540          | 2.53         | 0.132        | 20 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 21.8     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-37\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-37

**LLI Sample #** SW 6250832  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 09:15 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/06/2011 16:15

West Chester PA 19381

Reported: 04/15/2011 13:54

10A37

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA     | 04/11/2011 19:50       | Emily R Styer        | 0.93            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 09:15       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 09:15       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 09:15       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 05:23       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 21:45       | David K Beck         | 20              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |





# Analysis Report

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**Sample Description:** BH-10-36\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-36

LLI Sample # SW 6250833  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 09:40 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/06/2011 16:15

Reported: 04/15/2011 13:54

10A36

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 8            | 6                          | 0.6                        | 0.91            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.91            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.91            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.91            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.91            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.91            |
| 10950        | Toluene                     | 108-88-3            | 9            | 6                          | 1                          | 0.91            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 6          | 6                          | 1                          | 0.91            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 6          | 6                          | 1                          | 0.91            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 6          | 6                          | 1                          | 0.91            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 1,800        | 1,000        | 200          | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 1,800        | 1,000        | 200          | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 2,400        | 1,000        | 200          | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 1,300        | 1,000        | 200          | 5 |
| 10724        | Chrysene             | 218-01-9            | 2,200        | 1,000        | 200          | 5 |
| 10724        | Fluorene             | 86-73-7             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Phenanthrene         | 85-01-8             | 1,900        | 1,000        | 200          | 5 |
| 10724        | Pyrene               | 129-00-0            | 3,100        | 1,000        | 200          | 5 |

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 390          | 1.21         | 0.0627       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 18.7     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-36\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-36

**LLI Sample #** SW 6250833  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 09:40 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A36

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA     | 04/11/2011 20:13       | Emily R Styer        | 0.91            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 09:40       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 09:40       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 09:40       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 07:32       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 21:47       | David K Beck         | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-38\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-38

LLI Sample # SW 6250834  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/06/2011 16:15

West Chester PA 19381

Reported: 04/15/2011 13:54

10A38

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 9          | 9                          | 0.9                        | 1.52            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 9          | 9                          | 2                          | 1.52            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 9          | 9                          | 2                          | 1.52            |
| 10950        | Ethylbenzene                | 100-41-4            | < 9          | 9                          | 2                          | 1.52            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 9          | 9                          | 2                          | 1.52            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 9          | 9                          | 0.9                        | 1.52            |
| 10950        | Toluene                     | 108-88-3            | < 9          | 9                          | 2                          | 1.52            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 9          | 9                          | 2                          | 1.52            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 9          | 9                          | 2                          | 1.52            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 9          | 9                          | 2                          | 1.52            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Chrysene             | 218-01-9            | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Fluorene             | 86-73-7             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Phenanthrene         | 85-01-8             | < 1,000      | 1,000        | 200          | 5 |
| 10724        | Pyrene               | 129-00-0            | < 1,000      | 1,000        | 200          | 5 |

Reporting limits were raised due to interference from the sample matrix.

| Metals     | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|------------|-------------|-------|-------|--------|---|
| 06135 Lead | 7439-92-1   | 11.6  | 0.231 | 0.0120 | 2 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 16.9 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|--------|--------|------------------------|---------|-----------------|
|---------|---------------|--------|--------|--------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-38\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-38

**LLI Sample #** SW 6250834  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A38

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA     | 04/11/2011 20:36       | Emily R Styer        | 1.52            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 07:58       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 21:55       | David K Beck         | 2               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-41\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-41

LLI Sample # SW 6250835  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 10:25 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/06/2011 16:15

West Chester PA 19381

Reported: 04/15/2011 13:54

10A41

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 8          | 8                          | 0.8                        | 1.05            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 8          | 8                          | 2                          | 1.05            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 8          | 8                          | 2                          | 1.05            |
| 10950        | Ethylbenzene                | 100-41-4            | < 8          | 8                          | 2                          | 1.05            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 8          | 8                          | 2                          | 1.05            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 8          | 8                          | 0.8                        | 1.05            |
| 10950        | Toluene                     | 108-88-3            | 10           | 8                          | 2                          | 1.05            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 14           | 8                          | 2                          | 1.05            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 8          | 8                          | 2                          | 1.05            |
| 10950        | Xylene (Total)              | 1330-20-7           | 12           | 8                          | 2                          | 1.05            |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Chrysene             | 218-01-9            | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Fluorene             | 86-73-7             | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Phenanthrene         | 85-01-8             | < 6,200      | 6,200        | 1,200        | 5 |
| 10724        | Pyrene               | 129-00-0            | < 6,200      | 6,200        | 1,200        | 5 |

Reporting limits were raised due to interference from the sample matrix.

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|--------|------|-------------|-------|-------|--------|---|
| 06135  | Lead | 7439-92-1   | 186   | 0.750 | 0.0390 | 5 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 34.0 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst       | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|---------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA | 04/11/2011 21:00       | Emily R Styer | 1.05            |

\*=This limit was used in the evaluation of the final result



**Sample Description:** BH-10-41\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-41

**LLI Sample #** SW 6250835  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 10:25 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A41

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:25       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:25       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 10:25       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 08:24       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 21:57       | David K Beck         | 5               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

**Sample Description:** BH-10-40\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-40

LLI Sample # SW 6250836  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 11:10 by SS

SUN: Aquaterra Tech.

Submitted: 04/06/2011 16:15

PO Box 744

Reported: 04/15/2011 13:54

West Chester PA 19381

10A40

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.79            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.79            |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 0.9                        | 0.79            |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 0.9                        | 0.79            |
| <b>GC/MS</b> | <b>Semivolatiles</b>        | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10724        | Anthracene                  | 120-12-7            | 4,700        | 970                        | 190                        | 5               |
| 10724        | Benzo(a)anthracene          | 56-55-3             | 11,000       | 970                        | 190                        | 5               |
| 10724        | Benzo(a)pyrene              | 50-32-8             | 9,200        | 970                        | 190                        | 5               |
| 10724        | Benzo(b)fluoranthene        | 205-99-2            | 12,000       | 970                        | 190                        | 5               |
| 10724        | Benzo(g,h,i)perylene        | 191-24-2            | 4,800        | 970                        | 190                        | 5               |
| 10724        | Chrysene                    | 218-01-9            | 10,000       | 970                        | 190                        | 5               |
| 10724        | Fluorene                    | 86-73-7             | 1,300        | 970                        | 190                        | 5               |
| 10724        | Naphthalene                 | 91-20-3             | < 970        | 970                        | 190                        | 5               |
| 10724        | Phenanthrene                | 85-01-8             | 18,000       | 970                        | 190                        | 5               |
| 10724        | Pyrene                      | 129-00-0            | 20,000       | 970                        | 190                        | 5               |

Reporting limits were raised due to interference from the sample matrix.

|                      |                    |              |              |              |   |
|----------------------|--------------------|--------------|--------------|--------------|---|
| <b>Metals</b>        | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06135 Lead           | 7439-92-1          | 65.1         | 0.233        | 0.0121       | 2 |
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b> | <b>%</b>     | <b>%</b>     | <b>%</b>     |   |
| 00111 Moisture       | n.a.               | 15.0         | 0.50         | 0.50         | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst       | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|---------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA | 04/11/2011 21:23       | Emily R Styer | 0.79            |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-40\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-40

**LLI Sample #** SW 6250836  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 11:10 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A40

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 11:10       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 11:10       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 11:10       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 08:49       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 21:59       | David K Beck         | 2               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-39\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-39

**LLI Sample #** SW 6250837  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 11:30 by SS

SUN: Aquaterra Tech.

**Submitted:** 04/06/2011 16:15

PO Box 744

**Reported:** 04/15/2011 13:54

West Chester PA 19381

10A39

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 800        | 800                        | 80                         | 121.6           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 800        | 800                        | 160                        | 121.6           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 800        | 800                        | 160                        | 121.6           |
| 10950        | Ethylbenzene                | 100-41-4            | < 800        | 800                        | 160                        | 121.6           |
| 10950        | Isopropylbenzene            | 98-82-8             | 2,500        | 800                        | 160                        | 121.6           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 800        | 800                        | 80                         | 121.6           |
| 10950        | Toluene                     | 108-88-3            | < 800        | 800                        | 160                        | 121.6           |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 800        | 800                        | 160                        | 121.6           |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 800        | 800                        | 160                        | 121.6           |
| 10950        | Xylene (Total)              | 1330-20-7           | < 800        | 800                        | 160                        | 121.6           |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 12,000       | 11,000       | 2,200        | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 22,000       | 11,000       | 2,200        | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 16,000       | 11,000       | 2,200        | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 25,000       | 11,000       | 2,200        | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 11,000     | 11,000       | 2,200        | 5 |
| 10724        | Chrysene             | 218-01-9            | 23,000       | 11,000       | 2,200        | 5 |
| 10724        | Fluorene             | 86-73-7             | < 11,000     | 11,000       | 2,200        | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 11,000     | 11,000       | 2,200        | 5 |
| 10724        | Phenanthrene         | 85-01-8             | 50,000       | 11,000       | 2,200        | 5 |
| 10724        | Pyrene               | 129-00-0            | 51,000       | 11,000       | 2,200        | 5 |

Reporting limits were raised due to interference from the sample matrix.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 415          | 1.30         | 0.0677       | 10 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 23.9     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|-----------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | Q111021AA | 04/12/2011 13:50       | Lauren C Temple | 121.6           |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-39\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-39

**LLI Sample #** SW 6250837  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 11:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A39

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 11:30       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 11:30       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 11:30       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 09:15       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:02       | David K Beck         | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |



**Sample Description:** BH-10-71\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-71

LLI Sample # SW 6250838  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/06/2011 16:15

Reported: 04/15/2011 13:54

10A71

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 19           | 6                          | 0.6                        | 0.95            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 6          | 6                          | 1                          | 0.95            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 6          | 6                          | 1                          | 0.95            |
| 10950        | Ethylbenzene                | 100-41-4            | < 6          | 6                          | 1                          | 0.95            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 6          | 6                          | 1                          | 0.95            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 6          | 6                          | 0.6                        | 0.95            |
| 10950        | Toluene                     | 108-88-3            | 14           | 6                          | 1                          | 0.95            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | 11           | 6                          | 1                          | 0.95            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 6          | 6                          | 1                          | 0.95            |
| 10950        | Xylene (Total)              | 1330-20-7           | 16           | 6                          | 1                          | 0.95            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 1,100        | 1,000        | 210          | 5 |
| 10724        | Chrysene             | 218-01-9            | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Fluorene             | 86-73-7             | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Phenanthrene         | 85-01-8             | < 1,000      | 1,000        | 210          | 5 |
| 10724        | Pyrene               | 129-00-0            | < 1,000      | 1,000        | 210          | 5 |

Reporting limits were raised due to interference from the sample matrix.

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |    |
|--------|------|-------------|-------|-------|--------|----|
| 06135  | Lead | 7439-92-1   | 244   | 1.25  | 0.0652 | 10 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 20.2 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 2 of 2

**Sample Description:** BH-10-71\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-71

**LLI Sample #** SW 6250838  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 13:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A71

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111011AA     | 04/11/2011 21:49       | Emily R Styer        | 0.95            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 13:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 13:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 13:00       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 09:41       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:04       | David K Beck         | 10              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** BH-10-72\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-72

**LLI Sample #** SW 6250839  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

**Submitted:** 04/06/2011 16:15

**Reported:** 04/15/2011 13:54

10A72

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 620        | 620                        | 62                         | 79.72           |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 620        | 620                        | 120                        | 79.72           |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 620        | 620                        | 120                        | 79.72           |
| 10950        | Ethylbenzene                | 100-41-4            | < 620        | 620                        | 120                        | 79.72           |
| 10950        | Isopropylbenzene            | 98-82-8             | < 620        | 620                        | 120                        | 79.72           |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 620        | 620                        | 62                         | 79.72           |
| 10950        | Toluene                     | 108-88-3            | < 620        | 620                        | 120                        | 79.72           |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 620        | 620                        | 120                        | 79.72           |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 620        | 620                        | 120                        | 79.72           |
| 10950        | Xylene (Total)              | 1330-20-7           | < 620        | 620                        | 120                        | 79.72           |

Reporting limits were raised due to interference from the sample matrix.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 13,000     | 13,000       | 2,600        | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 15,000       | 13,000       | 2,600        | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 49,000       | 13,000       | 2,600        | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 31,000       | 13,000       | 2,600        | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 47,000       | 13,000       | 2,600        | 5 |
| 10724        | Chrysene             | 218-01-9            | 27,000       | 13,000       | 2,600        | 5 |
| 10724        | Fluorene             | 86-73-7             | < 13,000     | 13,000       | 2,600        | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 13,000     | 13,000       | 2,600        | 5 |
| 10724        | Phenanthrene         | 85-01-8             | < 13,000     | 13,000       | 2,600        | 5 |
| 10724        | Pyrene               | 129-00-0            | 49,000       | 13,000       | 2,600        | 5 |

Reporting limits were raised due to interference from the sample matrix.

|               |                    |              |              |              |    |
|---------------|--------------------|--------------|--------------|--------------|----|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |    |
| 06135 Lead    | 7439-92-1          | 946          | 3.05         | 0.159        | 20 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 35.7     | 0.50     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|-------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | Q111032AA | 04/14/2011 06:05       | Stephanie A Selis | 79.72           |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-72\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-72

**LLI Sample #** SW 6250839  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 13:30 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A72

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 13:30       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 13:30       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 13:30       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 10:06       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:07       | David K Beck         | 20              |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result



# Analysis Report

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**Sample Description:** BH-10-73\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-73

LLI Sample # SW 6250840  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 14:00 by SS

SUN: Aquaterra Tech.

Submitted: 04/06/2011 16:15

PO Box 744

Reported: 04/15/2011 13:54

West Chester PA 19381

10A73

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | 16           | 9                          | 0.9                        | 1.07            |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 9          | 9                          | 2                          | 1.07            |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 9          | 9                          | 2                          | 1.07            |
| 10950        | Ethylbenzene                | 100-41-4            | < 9          | 9                          | 2                          | 1.07            |
| 10950        | Isopropylbenzene            | 98-82-8             | < 9          | 9                          | 2                          | 1.07            |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 9          | 9                          | 0.9                        | 1.07            |
| 10950        | Toluene                     | 108-88-3            | 18           | 9                          | 2                          | 1.07            |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 9          | 9                          | 2                          | 1.07            |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 9          | 9                          | 2                          | 1.07            |
| 10950        | Xylene (Total)              | 1330-20-7           | 12           | 9                          | 2                          | 1.07            |

The GC/MS volatile internal standard peak areas were outside the QC limits. A re-analysis was performed, and the matrix effect was confirmed.

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Chrysene             | 218-01-9            | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Fluorene             | 86-73-7             | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Naphthalene          | 91-20-3             | 17,000       | 14,000       | 2,900        | 5 |
| 10724        | Phenanthrene         | 85-01-8             | < 14,000     | 14,000       | 2,900        | 5 |
| 10724        | Pyrene               | 129-00-0            | < 14,000     | 14,000       | 2,900        | 5 |

Reporting limits were raised due to interference from the sample matrix.

|               |                    |              |              |              |       |
|---------------|--------------------|--------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6020</b> | <b>mg/kg</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 06135         | Lead               | 7439-92-1    | 4,550        | 17.1         | 0.887 |

|                                                                                                                                                                       |                    |          |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> | <b>%</b> |   |
| 00111                                                                                                                                                                 | Moisture           | n.a.     | 42.5     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---------|---------------|--------|---------------|------------------------|---------|-----------------|
|---------|---------------|--------|---------------|------------------------|---------|-----------------|

\*=This limit was used in the evaluation of the final result





# Analysis Report

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**Sample Description:** BH-10-73\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 BH-10-73

**LLI Sample #** SW 6250840  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

**Collected:** 04/05/2011 14:00 by SS

SUN: Aquaterra Tech.

PO Box 744

**Submitted:** 04/06/2011 16:15

West Chester PA 19381

**Reported:** 04/15/2011 13:54

10A73

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111021AA     | 04/12/2011 08:56       | Stephanie A Selis    | 1.07            |
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 14:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 14:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 14:00       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 10:32       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:09       | David K Beck         | 100             |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-1D\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 W-1D

LLI Sample # SW 6250841  
LLI Group # 1240830  
Account # 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

West Chester PA 19381

Submitted: 04/06/2011 16:15

Reported: 04/15/2011 13:54

W-1D-

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Limit of Quantitation* | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               | <b>ug/kg</b>               |                 |
| 10950        | Benzene                     | 71-43-2             | < 5          | 5                          | 0.5                        | 0.8             |
| 10950        | 1,2-Dibromoethane           | 106-93-4            | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | 1,2-Dichloroethane          | 107-06-2            | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | Ethylbenzene                | 100-41-4            | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | Isopropylbenzene            | 98-82-8             | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | Methyl Tertiary Butyl Ether | 1634-04-4           | < 5          | 5                          | 0.5                        | 0.8             |
| 10950        | Toluene                     | 108-88-3            | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | 1,2,4-Trimethylbenzene      | 95-63-6             | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | 1,3,5-Trimethylbenzene      | 108-67-8            | < 5          | 5                          | 0.9                        | 0.8             |
| 10950        | Xylene (Total)              | 1330-20-7           | < 5          | 5                          | 0.9                        | 0.8             |

|              |                      |                     |              |              |              |   |
|--------------|----------------------|---------------------|--------------|--------------|--------------|---|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8270C</b> | <b>ug/kg</b> | <b>ug/kg</b> | <b>ug/kg</b> |   |
| 10724        | Anthracene           | 120-12-7            | 2,300        | 960          | 190          | 5 |
| 10724        | Benzo(a)anthracene   | 56-55-3             | 3,700        | 960          | 190          | 5 |
| 10724        | Benzo(a)pyrene       | 50-32-8             | 2,700        | 960          | 190          | 5 |
| 10724        | Benzo(b)fluoranthene | 205-99-2            | 3,700        | 960          | 190          | 5 |
| 10724        | Benzo(g,h,i)perylene | 191-24-2            | 1,400        | 960          | 190          | 5 |
| 10724        | Chrysene             | 218-01-9            | 3,200        | 960          | 190          | 5 |
| 10724        | Fluorene             | 86-73-7             | 1,000        | 960          | 190          | 5 |
| 10724        | Naphthalene          | 91-20-3             | < 960        | 960          | 190          | 5 |
| 10724        | Phenanthrene         | 85-01-8             | 7,900        | 960          | 190          | 5 |
| 10724        | Pyrene               | 129-00-0            | 6,900        | 960          | 190          | 5 |

Reporting limits were raised due to interference from the sample matrix.

| Metals |      | SW-846 6020 | mg/kg | mg/kg | mg/kg  |   |
|--------|------|-------------|-------|-------|--------|---|
| 06135  | Lead | 7439-92-1   | 76.5  | 0.223 | 0.0116 | 2 |

| Wet Chemistry                                                                                                                                                         |          | SM20 2540 G | %    | %    | %    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|------|------|---|
| 00111                                                                                                                                                                 | Moisture | n.a.        | 13.6 | 0.50 | 0.50 | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |          |             |      |      |      |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/12

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#    | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|--------------------------------|--------------|--------|-----------|------------------------|---------------------|-----------------|
| 10950   | BTEX/MTBE/EDB/EDC/Cumene/TM Bs | SW-846 8260B | 1      | X111022AA | 04/13/2011 00:48       | Kristen D Pelliccia | 0.8             |

\*=This limit was used in the evaluation of the final result

**Sample Description:** W-1D\_0-2' Grab Soil  
Philadelphia Refinery AOI-10  
COC: 259432 W-1D

**LLI Sample #** SW 6250841  
**LLI Group #** 1240830  
**Account #** 10132

**Project Name:** SUN: Philadelphia Refinery AOI-10

Collected: 04/05/2011 10:00 by SS

SUN: Aquaterra Tech.

PO Box 744

Submitted: 04/06/2011 16:15

West Chester PA 19381

Reported: 04/15/2011 13:54

W-1D-

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                  | Method       | Trial# | Batch#        | Analysis Date and Time | Analyst              | Dilution Factor |
|---------|--------------------------------|--------------|--------|---------------|------------------------|----------------------|-----------------|
| 07579   | GC/MS-5g Field Preserv.MeOH-NC | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 1      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 02392   | L/H Field Preserved Bisulfate  | SW-846 5035  | 2      | 201109724044  | 04/05/2011 10:00       | Client Supplied      | 1               |
| 10724   | PAH 8270 (microwave)           | SW-846 8270C | 1      | 11102SLE026   | 04/14/2011 10:58       | Brian K Graham       | 5               |
| 10814   | BNA Soil Microwave PAH         | SW-846 3546  | 1      | 11102SLE026   | 04/13/2011 06:00       | Joseph S Feister     | 1               |
| 06135   | Lead                           | SW-846 6020  | 1      | 111011026001A | 04/12/2011 22:11       | David K Beck         | 2               |
| 11026   | SW SW846 ICP-MS Digest         | SW-846 3050B | 1      | 111011026001  | 04/11/2011 20:48       | Annamaria Stipkovits | 1               |
| 00111   | Moisture                       | SM20 2540 G  | 1      | 11098820002B  | 04/08/2011 16:55       | Scott W Freisher     | 1               |

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 01:54 PM

Group Number: 1240830

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                              | Blank Result | Blank LOQ** | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|--------------------------------------------|--------------|-------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: Q111021AA                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6250837                  |              |             |           |              |          |           |                 |     |         |
| Benzene                                    | < 250        | 250.        | 25        | ug/kg        | 97       | 94        | 80-120          | 3   | 30      |
| 1,2-Dibromoethane                          | < 250        | 250.        | 50        | ug/kg        | 95       | 95        | 80-120          | 0   | 30      |
| 1,2-Dichloroethane                         | < 250        | 250.        | 50        | ug/kg        | 95       | 94        | 71-129          | 1   | 30      |
| Ethylbenzene                               | < 250        | 250.        | 50        | ug/kg        | 93       | 90        | 80-120          | 4   | 30      |
| Isopropylbenzene                           | < 250        | 250.        | 50        | ug/kg        | 93       | 90        | 76-120          | 4   | 30      |
| Methyl Tertiary Butyl Ether                | < 250        | 250.        | 25        | ug/kg        | 90       | 92        | 74-121          | 3   | 30      |
| Toluene                                    | < 250        | 250.        | 50        | ug/kg        | 95       | 92        | 80-120          | 4   | 30      |
| 1,2,4-Trimethylbenzene                     | < 250        | 250.        | 50        | ug/kg        | 89       | 88        | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene                     | < 250        | 250.        | 50        | ug/kg        | 91       | 90        | 78-120          | 2   | 30      |
| Xylene (Total)                             | < 250        | 250.        | 50        | ug/kg        | 94       | 92        | 80-120          | 3   | 30      |
| Batch number: Q111032AA                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6250839                  |              |             |           |              |          |           |                 |     |         |
| Benzene                                    | < 250        | 250.        | 25        | ug/kg        | 97       | 98        | 80-120          | 1   | 30      |
| 1,2-Dibromoethane                          | < 250        | 250.        | 50        | ug/kg        | 90       | 95        | 80-120          | 6   | 30      |
| 1,2-Dichloroethane                         | < 250        | 250.        | 50        | ug/kg        | 93       | 95        | 71-129          | 3   | 30      |
| Ethylbenzene                               | < 250        | 250.        | 50        | ug/kg        | 92       | 94        | 80-120          | 3   | 30      |
| Isopropylbenzene                           | < 250        | 250.        | 50        | ug/kg        | 92       | 94        | 76-120          | 2   | 30      |
| Methyl Tertiary Butyl Ether                | < 250        | 250.        | 25        | ug/kg        | 83       | 91        | 74-121          | 9   | 30      |
| Toluene                                    | < 250        | 250.        | 50        | ug/kg        | 94       | 95        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                     | < 250        | 250.        | 50        | ug/kg        | 87       | 91        | 79-120          | 5   | 30      |
| 1,3,5-Trimethylbenzene                     | < 250        | 250.        | 50        | ug/kg        | 90       | 93        | 78-120          | 4   | 30      |
| Xylene (Total)                             | < 250        | 250.        | 50        | ug/kg        | 92       | 95        | 80-120          | 3   | 30      |
| Batch number: X111011AA                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6250832-6250836, 6250838 |              |             |           |              |          |           |                 |     |         |
| Benzene                                    | < 5          | 5.          | 0.5       | ug/kg        | 99       | 92        | 80-120          | 7   | 30      |
| 1,2-Dibromoethane                          | < 5          | 5.          | 1         | ug/kg        | 94       | 93        | 80-120          | 0   | 30      |
| 1,2-Dichloroethane                         | < 5          | 5.          | 1         | ug/kg        | 95       | 90        | 71-129          | 5   | 30      |
| Ethylbenzene                               | < 5          | 5.          | 1         | ug/kg        | 99       | 92        | 80-120          | 7   | 30      |
| Isopropylbenzene                           | < 5          | 5.          | 1         | ug/kg        | 96       | 91        | 76-120          | 6   | 30      |
| Methyl Tertiary Butyl Ether                | < 5          | 5.          | 0.5       | ug/kg        | 83       | 83        | 74-121          | 0   | 30      |
| Toluene                                    | < 5          | 5.          | 1         | ug/kg        | 100      | 94        | 80-120          | 6   | 30      |
| 1,2,4-Trimethylbenzene                     | < 5          | 5.          | 1         | ug/kg        | 105      | 99        | 79-120          | 5   | 30      |
| 1,3,5-Trimethylbenzene                     | < 5          | 5.          | 1         | ug/kg        | 108      | 100       | 78-120          | 7   | 30      |
| Xylene (Total)                             | < 5          | 5.          | 1         | ug/kg        | 97       | 92        | 80-120          | 6   | 30      |
| Batch number: X111021AA                    |              |             |           |              |          |           |                 |     |         |
| Sample number(s): 6250840                  |              |             |           |              |          |           |                 |     |         |
| Benzene                                    | < 5          | 5.          | 0.5       | ug/kg        | 100      | 98        | 80-120          | 3   | 30      |
| 1,2-Dibromoethane                          | < 5          | 5.          | 1         | ug/kg        | 89       | 100       | 80-120          | 12  | 30      |
| 1,2-Dichloroethane                         | < 5          | 5.          | 1         | ug/kg        | 92       | 94        | 71-129          | 2   | 30      |
| Ethylbenzene                               | < 5          | 5.          | 1         | ug/kg        | 99       | 97        | 80-120          | 2   | 30      |
| Isopropylbenzene                           | < 5          | 5.          | 1         | ug/kg        | 98       | 96        | 76-120          | 3   | 30      |
| Methyl Tertiary Butyl Ether                | < 5          | 5.          | 0.5       | ug/kg        | 82       | 90        | 74-121          | 9   | 30      |
| Toluene                                    | < 5          | 5.          | 1         | ug/kg        | 101      | 99        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                     | < 5          | 5.          | 1         | ug/kg        | 103      | 101       | 79-120          | 2   | 30      |
| 1,3,5-Trimethylbenzene                     | < 5          | 5.          | 1         | ug/kg        | 105      | 103       | 78-120          | 2   | 30      |
| Xylene (Total)                             | < 5          | 5.          | 1         | ug/kg        | 98       | 97        | 80-120          | 1   | 30      |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 01:54 PM

Group Number: 1240830

| <u>Analysis Name</u>        | <u>Blank Result</u>               | <u>Blank LOQ**</u> | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|-----------------------------|-----------------------------------|--------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Batch number: X111022AA     | Sample number(s): 6250841         |                    |                  |                     |                 |                  |                        |            |                |
| Benzene                     | < 5                               | 5.                 | 0.5              | ug/kg               | 101             | 98               | 80-120                 | 3          | 30             |
| 1,2-Dibromoethane           | < 5                               | 5.                 | 1                | ug/kg               | 105             | 98               | 80-120                 | 7          | 30             |
| 1,2-Dichloroethane          | < 5                               | 5.                 | 1                | ug/kg               | 93              | 89               | 71-129                 | 5          | 30             |
| Ethylbenzene                | < 5                               | 5.                 | 1                | ug/kg               | 108             | 103              | 80-120                 | 5          | 30             |
| Isopropylbenzene            | < 5                               | 5.                 | 1                | ug/kg               | 106             | 102              | 76-120                 | 4          | 30             |
| Methyl Tertiary Butyl Ether | < 5                               | 5.                 | 0.5              | ug/kg               | 87              | 82               | 74-121                 | 6          | 30             |
| Toluene                     | < 5                               | 5.                 | 1                | ug/kg               | 110             | 106              | 80-120                 | 4          | 30             |
| 1,2,4-Trimethylbenzene      | < 5                               | 5.                 | 1                | ug/kg               | 114             | 109              | 79-120                 | 5          | 30             |
| 1,3,5-Trimethylbenzene      | < 5                               | 5.                 | 1                | ug/kg               | 116             | 110              | 78-120                 | 5          | 30             |
| Xylene (Total)              | < 5                               | 5.                 | 1                | ug/kg               | 107             | 102              | 80-120                 | 5          | 30             |
| Batch number: 11102SLE026   | Sample number(s): 6250832-6250841 |                    |                  |                     |                 |                  |                        |            |                |
| Anthracene                  | < 170                             | 170.               | 33               | ug/kg               | 100             |                  | 83-111                 |            |                |
| Benzo(a)anthracene          | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 82-111                 |            |                |
| Benzo(a)pyrene              | < 170                             | 170.               | 33               | ug/kg               | 97              |                  | 63-138                 |            |                |
| Benzo(b)fluoranthene        | < 170                             | 170.               | 33               | ug/kg               | 106             |                  | 61-133                 |            |                |
| Benzo(g,h,i)perylene        | < 170                             | 170.               | 33               | ug/kg               | 104             |                  | 63-130                 |            |                |
| Chrysene                    | < 170                             | 170.               | 33               | ug/kg               | 94              |                  | 81-111                 |            |                |
| Fluorene                    | < 170                             | 170.               | 33               | ug/kg               | 98              |                  | 81-117                 |            |                |
| Naphthalene                 | < 170                             | 170.               | 33               | ug/kg               | 91              |                  | 83-112                 |            |                |
| Phenanthrene                | < 170                             | 170.               | 33               | ug/kg               | 98              |                  | 83-109                 |            |                |
| Pyrene                      | < 170                             | 170.               | 33               | ug/kg               | 101             |                  | 80-121                 |            |                |
| Batch number: 111011026001A | Sample number(s): 6250832-6250841 |                    |                  |                     |                 |                  |                        |            |                |
| Lead                        | < 0.200                           | 0.200              | 0.0104           | mg/kg               | 100             |                  | 83-110                 |            |                |
| Batch number: 11098820002B  | Sample number(s): 6250832-6250841 |                    |                  |                     |                 |                  |                        |            |                |
| Moisture                    |                                   |                    |                  |                     | 100             |                  | 99-101                 |            |                |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS %REC</u>                                                | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|-----------------------------|---------------------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: 11102SLE026   | Sample number(s): 6250832-6250841 UNSPK: 6250832              |                 |                      |            |                |                 |                 |                |                    |
| Anthracene                  | 264*                                                          | 105             | 40-147               | 58*        | 30             |                 |                 |                |                    |
| Benzo(a)anthracene          | 435*                                                          | 109             | 32-150               | 56*        | 30             |                 |                 |                |                    |
| Benzo(a)pyrene              | 389*                                                          | 99              | 57-129               | 53*        | 30             |                 |                 |                |                    |
| Benzo(b)fluoranthene        | 342 (2)                                                       | 114 (2)         | 53-131               | 34*        | 30             |                 |                 |                |                    |
| Benzo(g,h,i)perylene        | 229*                                                          | 106             | 60-123               | 35*        | 30             |                 |                 |                |                    |
| Chrysene                    | 377*                                                          | 112             | 76-114               | 49*        | 30             |                 |                 |                |                    |
| Fluorene                    | 181*                                                          | 97              | 46-137               | 47*        | 30             |                 |                 |                |                    |
| Naphthalene                 | 210*                                                          | 96              | 52-132               | 56*        | 30             |                 |                 |                |                    |
| Phenanthrene                | 787 (2)                                                       | 161 (2)         | 34-147               | 71*        | 30             |                 |                 |                |                    |
| Pyrene                      | 666 (2)                                                       | 137 (2)         | 76-124               | 59*        | 30             |                 |                 |                |                    |
| Batch number: 111011026001A | Sample number(s): 6250832-6250841 UNSPK: P252458 BKG: P252458 |                 |                      |            |                |                 |                 |                |                    |
| Lead                        | 108                                                           | 101             | 75-125               | 2          | 20             | 4.06            | 4.30            | 6              | 20                 |
| Batch number: 11098820002B  | Sample number(s): 6250832-6250841 BKG: P252007                |                 |                      |            |                |                 |                 |                |                    |

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 01:54 PM

Group Number: 1240830

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u> | <u>MS</u><br><u>%REC</u> | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|----------------------|--------------------------|---------------------------|--------------------------------|------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Moisture             |                          |                           |                                |            |                          | 13.0                      | 13.5                      | 4                        | 15                           |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: Q111021AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |     |     |     |
|---------|-----|-----|-----|-----|
| 6250837 | 64* | 64* | 54* | 56* |
| Blank   | 90  | 95  | 93  | 90  |
| LCS     | 85  | 86  | 86  | 85  |
| LCSD    | 84  | 88  | 84  | 84  |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: Q111032AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |     |     |     |
|---------|-----|-----|-----|-----|
| 6250839 | 54* | 53* | 41* | 37* |
| Blank   | 88  | 92  | 90  | 87  |
| LCS     | 86  | 88  | 86  | 84  |
| LCSD    | 86  | 89  | 86  | 85  |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111011AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |      |      |      |     |
|---------|------|------|------|-----|
| 6250832 | 99   | 102  | 116  | 86  |
| 6250833 | 104  | 106  | 132* | 75  |
| 6250834 | 123* | 130* | 146* | 68* |
| 6250835 | 115* | 132* | 137* | 60* |
| 6250836 | 95   | 99   | 110  | 88  |
| 6250838 | 101  | 109  | 131* | 81  |
| Blank   | 97   | 99   | 98   | 101 |
| LCS     | 95   | 99   | 107  | 104 |
| LCSD    | 94   | 101  | 108  | 104 |

Limits: 71-114 70-109 70-123 70-111

Analysis Name: TCL(4.3)by 8260(soil)

Batch number: X111021AA

Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene

|         |     |      |      |     |
|---------|-----|------|------|-----|
| 6250840 | 108 | 111* | 137* | 66* |
|---------|-----|------|------|-----|

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: SUN: Aquaterra Tech.  
Reported: 04/15/11 at 01:54 PM

Group Number: 1240830

### Surrogate Quality Control

|       |    |     |     |     |
|-------|----|-----|-----|-----|
| Blank | 96 | 101 | 98  | 101 |
| LCS   | 92 | 100 | 109 | 103 |
| LCSD  | 93 | 102 | 109 | 104 |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: TCL(4.3)by 8260 (soil)

Batch number: X111022AA

|  | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|--|----------------------|-----------------------|------------|----------------------|
|--|----------------------|-----------------------|------------|----------------------|

|         |    |     |     |     |
|---------|----|-----|-----|-----|
| 6250841 | 95 | 100 | 114 | 83  |
| Blank   | 93 | 98  | 101 | 99  |
| LCS     | 90 | 105 | 111 | 104 |
| LCSD    | 90 | 100 | 113 | 103 |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: PAH 8270 (microwave)

Batch number: 11102SLE026

|  | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|--|-----------------|------------------|---------------|
|--|-----------------|------------------|---------------|

|         |     |     |     |
|---------|-----|-----|-----|
| 6250832 | 87  | 91  | 83  |
| 6250833 | 93  | 98  | 91  |
| 6250834 | 84  | 91  | 80  |
| 6250835 | 92  | 102 | 92  |
| 6250836 | 98  | 99  | 97  |
| 6250837 | 118 | 104 | 103 |
| 6250838 | 84  | 88  | 76  |
| 6250839 | 106 | 113 | 107 |
| 6250840 | 95  | 101 | 102 |
| 6250841 | 92  | 97  | 103 |
| Blank   | 103 | 110 | 108 |
| LCS     | 101 | 110 | 103 |
| MS      | 97  | 104 | 90  |
| MSD     | 94  | 100 | 88  |

|         |        |        |        |
|---------|--------|--------|--------|
| Limits: | 55-121 | 56-121 | 43-124 |
|---------|--------|--------|--------|

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only

Acct. # 10132 Group# 1240830 Sample # 6250832-41

COC # 259432

Please print. Instructions on reverse side correspond with circled numbers.

| <b>1</b> Client: <u>SUN / AQUATERRA</u> Acct. #: _____<br>Project Name/ #: <u>PHILA REF AOI-10</u> PWSID #: _____<br>Project Manager: <u>T. DOERR</u> P.O. #: _____<br>Sampler: <u>S. SYKES</u> Quote #: _____<br>Name of state where samples were collected: <u>PA</u>                                   |                    |                    |                 | <b>4</b> Matrix<br><input type="checkbox"/> Potable <input type="checkbox"/> Check if Applicable<br><input type="checkbox"/> NPDES |                    | <b>5</b> Analyses Requested<br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="12">Preservation Codes</th> </tr> <tr> <td>Lead (Total)</td> <td>1,2-Dichloroethane</td> <td>1,2,4- / 1,3,5-TMS</td> <td>Benzene, Cumene</td> <td>Ethylbenzene</td> <td>Ethylene dibromide</td> <td>Methyl tertiary butyl ether</td> <td>Toluene</td> <td>Xylenes (Total)</td> <td>Chrysene, Fluorene</td> <td>Naphthalene</td> <td>Phenanthrene</td> <td>Pyrene</td> <td>Anthracene, Benzo(a)anthracene</td> <td>Benzo(b)fluoranthene</td> <td>Benzo(k)fluoranthene</td> <td>Benzo(g,h,i)perylene</td> <td>Fluoranthene</td> </tr> </table> |         |                                                |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                                                              |                                |                                                |                      |                                                |              | Preservation Codes                             |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  | Lead (Total) | 1,2-Dichloroethane | 1,2,4- / 1,3,5-TMS | Benzene, Cumene | Ethylbenzene | Ethylene dibromide | Methyl tertiary butyl ether | Toluene | Xylenes (Total) | Chrysene, Fluorene | Naphthalene | Phenanthrene | Pyrene | Anthracene, Benzo(a)anthracene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Benzo(g,h,i)perylene | Fluoranthene | <b>For Lab Use Only</b><br>FSC: _____<br>SCR#: <u>103563</u><br><b>Preservation Codes</b><br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------|--------------------------------|------------------------------------------------|----------------------|------------------------------------------------|--------------|------------------------------------------------|--|------------------------------------------------|--|------------------------------------------------|--|------------------------------------------------|--|------------------------------------------------|--|-----------|--|--------------|--------------------|--------------------|-----------------|--------------|--------------------|-----------------------------|---------|-----------------|--------------------|-------------|--------------|--------|--------------------------------|----------------------|----------------------|----------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------|--|
| Preservation Codes                                                                                                                                                                                                                                                                                        |                    |                    |                 |                                                                                                                                    |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                                                |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                                                              |                                |                                                |                      |                                                |              |                                                |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |
| Lead (Total)                                                                                                                                                                                                                                                                                              | 1,2-Dichloroethane | 1,2,4- / 1,3,5-TMS | Benzene, Cumene | Ethylbenzene                                                                                                                       | Ethylene dibromide | Methyl tertiary butyl ether                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Toluene | Xylenes (Total)                                | Chrysene, Fluorene | Naphthalene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Phenanthrene | Pyrene                                                       | Anthracene, Benzo(a)anthracene | Benzo(b)fluoranthene                           | Benzo(k)fluoranthene | Benzo(g,h,i)perylene                           | Fluoranthene |                                                |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                            |                    |                    |                 | Date Collected                                                                                                                     |                    | Time Collected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         | <b>3</b> Grab Composite                        |                    | Soil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              | Water                                                        |                                | Other                                          |                      | Total # of Containers                          |              | Remarks                                        |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |
| BH-10-37 -0-2'<br>BH-10-36 -0-2'<br>BH-10-38 -0-2'<br>BH-10-41 -0-2'<br>BH-10-40 -0-2'<br>BH-10-39 -0-2'<br>BH-10-71 -0-2'<br>BH-10-72 -0-2'<br>BH-10-73 -0-2'<br>W-10 -0-2'                                                                                                                              |                    |                    |                 | 4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11<br>4/5/11                                   |                    | 915<br>940<br>1000<br>1025<br>1110<br>1130<br>1300<br>1330<br>1400<br>1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |                    | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X               |                                | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |                      | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |              | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |  | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |  | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |  | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |  | X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X<br>X |  | 1.0-1.8°C |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): Normal Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____ |                    |                    |                 |                                                                                                                                    |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                                                |                    | Relinquished by: <u>Bottle Storage</u> Date Time Received by: _____ Date Time<br>Relinquished by: <u>Shirley / AQUATERRA</u> Date <u>4/5/11</u> Time <u>700</u> Received by: <u>Sample Fridge</u> Date <u>4/6/11</u> Time <u>700</u><br>Relinquished by: <u>Shirley / AQUATERRA</u> Date <u>4/6/11</u> Time <u>1415</u> Received by: <u>Shirley</u> Date <u>4/6/11</u> Time <u>1415</u><br>Relinquished by: <u>Shirley</u> Date <u>4/6/11</u> Time <u>1415</u> Received by: <u>Shirley</u> Date <u>4/6/11</u> Time <u>1415</u> |              |                                                              |                                | <b>9</b>                                       |                      |                                                |              |                                                |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No<br>Type IV (CLP SOW) Internal COC Required? Yes / No<br>Type VI (Raw Data Only)                      |                    |                    |                 |                                                                                                                                    |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                                                |                    | SDG Complete? Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              | (If yes, indicate QC sample and submit triplicate vol. r.e.) |                                |                                                |                      |                                                |              |                                                |  |                                                |  |                                                |  |                                                |  |                                                |  |           |  |              |                    |                    |                 |              |                    |                             |         |                 |                    |             |              |        |                                |                      |                      |                      |              |                                                                                                                                                                                           |  |                                                             |  |

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                 |                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|
| <b>RL</b>               | Reporting Limit                                                                                                                                                                                                                                                                                                                                                    | <b>BMQL</b>     | Below Minimum Quantitation Level |
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>MPN</b>      | Most Probable Number             |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>CP Units</b> | cobalt-chloroplatinate units     |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>NTU</b>      | nephelometric turbidity units    |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>ng</b>       | nanogram(s)                      |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>        | degrees Fahrenheit               |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>lb.</b>      | pound(s)                         |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>kg</b>       | kilogram(s)                      |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>mg</b>       | milligram(s)                     |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>l</b>        | liter(s)                         |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>ul</b>       | microliter(s)                    |
| <b>&lt;</b>             | less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                 |                                  |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                 |                                  |
| <b>J</b>                | estimated value – The result is $\geq$ the Method Detection Limit (MDL) and $<$ the Limit of Quantitation (LOQ).                                                                                                                                                                                                                                                   |                 |                                  |
| <b>ppm</b>              | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                 |                                  |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                 |                                  |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.                                                                                                         |                 |                                  |

## U.S. EPA CLP Data Qualifiers:

### Organic Qualifiers

|              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                              |
| <b>B</b>     | Analyte was also detected in the blank                                    |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                       |
| <b>D</b>     | Compound quantitated on a diluted sample                                  |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument             |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                            |
| <b>P</b>     | Concentration difference between primary and confirmation columns $>25\%$ |
| <b>U</b>     | Compound was not detected                                                 |
| <b>X,Y,Z</b> | Defined in case narrative                                                 |

### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is $<CRDL$ , but $\geq IDL$                       |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike sample not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA $<0.995$                |

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**ANALYTICAL RESULTS**

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

Prepared for:

Sunoco c/o Stantec  
1060 Andrew Drive  
Suite 140  
West Chester PA 19380

April 28, 2010

Project: West Yard Surface Sampling

Submittal Date: 04/15/2010  
Group Number: 1190562  
PO Number: WEST YARD SURFACE  
State of Sample Origin: PA

| <u>Client Sample Description</u> | <u>Lancaster Labs (LLI) #</u> |
|----------------------------------|-------------------------------|
| SS-1 Grab Soil Sample            | 5955218                       |
| SS-2 Grab Soil Sample            | 5955219                       |
| SS-3 Grab Soil Sample            | 5955220                       |
| SS-4 Grab Soil Sample            | 5955221                       |
| SS-5 Grab Soil Sample            | 5955222                       |
| SS-6 Grab Soil Sample            | 5955223                       |
| SS-7 Grab Soil Sample            | 5955224                       |
| SS-8 Grab Soil Sample            | 5955225                       |
| SS-9 Grab Soil Sample            | 5955226                       |
| SS-10 Grab Soil Sample           | 5955227                       |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

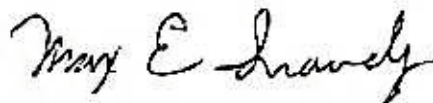
ELECTRONIC      Sunoco c/o Stantec  
COPY TO

Attn: Jennifer Menges



Questions? Contact your Client Services Representative  
Loran A Carter at (717) 656-2300 Ext. 1375

Respectfully Submitted,



Max E. Snively  
Senior Specialist

**Sample Description: SS-1 Grab Soil Sample  
West Yard Surface Sampling**

**LLI Sample # SW 5955218  
LLI Group # 1190562  
Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:15 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-01

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 10           | 0.6                        | 1.11            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 1.11            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 1.11            |
| 10102        | Ethylbenzene                | 100-41-4            | 2 J          | 1                          | 1.11            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 1.11            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                        | 1.11            |
| 10102        | Naphthalene                 | 91-20-3             | 60           | 1                          | 1.11            |
| 10102        | Toluene                     | 108-88-3            | 13           | 1                          | 1.11            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 230          | 1                          | 1.11            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 450          | 52                         | 48.36           |
| 10102        | Xylene (Total)              | 1330-20-7           | 11           | 1                          | 1.11            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

The value reported for naphthalene is an estimated maximum possible concentration due to interference from a non-target compound.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 750          | 7.2          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 750          | 3.6          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 580          | 3.6          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 760          | 2.9          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 1,100        | 22           | 10 |
| 00941        | Chrysene             | 218-01-9           | 3,100        | 22           | 10 |
| 00941        | Fluorene             | 86-73-7            | 1,400        | 36           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 3,900        | 14           | 10 |
| 00941        | Pyrene               | 129-00-0           | N.D.         | 7,300        | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg.

The blank value was not subtracted from the analytical result.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for Pyrene. The reporting limit for this compound was raised accordingly.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 169          | 0.622        | 1 |

|                      |                    |          |          |   |
|----------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture       | n.a.               | 7.3      | 0.50     | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

**Sample Description: SS-1 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955218  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:15 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-01

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:15       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 09:15       | Client Supplied   | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/18/2010 21:38       | Nicholas P Riehl  | 1.11            |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | R101091AA    | 04/19/2010 15:03       | Kerri E Koch      | 48.36           |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 14:16       | Mark A Clark      | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 01:37       | Tara L Snyder     | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Connors  | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher  | 1               |

**Sample Description: SS-2 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955219  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:30 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-02

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 8            | 0.6                        | 1.01            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 1.01            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 1.01            |
| 10102        | Ethylbenzene                | 100-41-4            | N.D.         | 1                          | 1.01            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 1.01            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                        | 1.01            |
| 10102        | Naphthalene                 | 91-20-3             | 16           | 1                          | 1.01            |
| 10102        | Toluene                     | 108-88-3            | 6            | 1                          | 1.01            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 5 J          | 1                          | 1.01            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 5 J          | 1                          | 1.01            |
| 10102        | Xylene (Total)              | 1330-20-7           | 3 J          | 1                          | 1.01            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 240          | 7.5          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 530          | 3.7          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 480          | 3.7          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 590          | 3.0          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 1,000        | 22           | 10 |
| 00941        | Chrysene             | 218-01-9           | 1,700        | 22           | 10 |
| 00941        | Fluorene             | 86-73-7            | 200          | 37           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 830          | 15           | 10 |
| 00941        | Pyrene               | 129-00-0           | N.D.         | 1,200        | 10 |

The following compounds were detected in the method blank at the respective concentrations of:

Phenanthrene (1.54 ug/kg)  
Benzo(b)fluoranthene (0.36 ug/kg)

These blank values were not subtracted from the analytical results.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for Pyrene. The reporting limit for this compound was raised accordingly.

|                      |                     |              |              |   |
|----------------------|---------------------|--------------|--------------|---|
| <b>Metals</b>        | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead           | 7439-92-1           | 209          | 0.664        | 1 |
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b>  | <b>%</b>     | <b>%</b>     |   |
| 00111 Moisture       | n.a.                | 10.6         | 0.50         | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

**Sample Description: SS-2 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955219**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:30 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-02

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:30       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:30       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 09:30       | Client Supplied  | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/18/2010 22:01       | Nicholas P Riehl | 1.01            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10109SLB026  | 04/23/2010 10:18       | Mark A Clark     | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 1      | 10109SLB026  | 04/19/2010 15:00       | Doreen K Robles  | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 01:40       | Tara L Snyder    | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher | 1               |



**Sample Description: SS-3 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955220**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:45 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-03

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 10           | 0.6                        | 1.06            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 1.06            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 1.06            |
| 10102        | Ethylbenzene                | 100-41-4            | 3 J          | 1                          | 1.06            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 1.06            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                        | 1.06            |
| 10102        | Naphthalene                 | 91-20-3             | 42           | 1                          | 1.06            |
| 10102        | Toluene                     | 108-88-3            | 23           | 1                          | 1.06            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 29           | 1                          | 1.06            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 25           | 1                          | 1.06            |
| 10102        | Xylene (Total)              | 1330-20-7           | 14           | 1                          | 1.06            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 760          | 7.2          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 1,800        | 18           | 50 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 1,400        | 18           | 50 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 1,700        | 14           | 50 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 2,300        | 22           | 10 |
| 00941        | Chrysene             | 218-01-9           | 5,500        | 22           | 10 |
| 00941        | Fluorene             | 86-73-7            | 750          | 36           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 3,600        | 14           | 10 |
| 00941        | Pyrene               | 129-00-0           | 5,600        | 36           | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg. The blank value was not subtracted from the analytical result.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 270          | 0.648        | 1 |

|                      |                    |          |          |   |
|----------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture       | n.a.               | 7.4      | 0.50     | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description: SS-3 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955220**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 09:45 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-03

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 09:45       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 09:45       | Client Supplied   | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/18/2010 22:23       | Nicholas P Riehl  | 1.06            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 18:00       | Mark A Clark      | 10              |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/28/2010 08:41       | Mark A Clark      | 50              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 01:50       | Tara L Snyder     | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Connors  | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher  | 1               |

**Sample Description: SS-4 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955221**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:00 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-04

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 10           | 0.5                        | 0.86            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 0.86            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 0.86            |
| 10102        | Ethylbenzene                | 100-41-4            | 23           | 1                          | 0.86            |
| 10102        | Isopropylbenzene            | 98-82-8             | 5            | 1                          | 0.86            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                        | 0.86            |
| 10102        | Naphthalene                 | 91-20-3             | 770          | 59                         | 52.45           |
| 10102        | Toluene                     | 108-88-3            | 33           | 1                          | 0.86            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 650          | 59                         | 52.45           |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 190 J        | 59                         | 52.45           |
| 10102        | Xylene (Total)              | 1330-20-7           | 180          | 1                          | 0.86            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

The concentration reported for 1,3,5-trimethylbenzene is estimated since it exceeded the calibration range of the instrument when determined by the low level method, but was less than the quantitation limit when determined by the high level method. The result reported is from the high level determination.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 550          | 7.5          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 970          | 3.7          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 880          | 3.7          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 960          | 3.0          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 1,400        | 22           | 10 |
| 00941        | Chrysene             | 218-01-9           | 3,000        | 22           | 10 |
| 00941        | Fluorene             | 86-73-7            | 640          | 37           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 2,600        | 15           | 10 |
| 00941        | Pyrene               | 129-00-0           | N.D.         | 5,100        | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg. The blank value was not subtracted from the analytical result.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for Pyrene. The reporting limit for this compound was raised accordingly.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 190          | 0.667        | 1 |

|                                                                                                                                                                       |                    |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 10.9     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |   |

**Sample Description: SS-4 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955221**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:00 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-04

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:00       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 10:00       | Client Supplied     | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | R101091AA    | 04/19/2010 16:59       | Kerri E Koch        | 52.45           |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101092AA    | 04/20/2010 04:07       | Angela D Sneeringer | 0.86            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 18:47       | Mark A Clark        | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard   | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 01:53       | Tara L Snyder       | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners    | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher    | 1               |

**Sample Description: SS-5 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955222  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:15 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-05

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 5            | 0.4                        | 0.83            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                        | 0.83            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                        | 0.83            |
| 10102        | Ethylbenzene                | 100-41-4            | N.D.         | 0.9                        | 0.83            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                        | 0.83            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.4                        | 0.83            |
| 10102        | Naphthalene                 | 91-20-3             | 21           | 0.9                        | 0.83            |
| 10102        | Toluene                     | 108-88-3            | 5            | 0.9                        | 0.83            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 12           | 0.9                        | 0.83            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 5            | 0.9                        | 0.83            |
| 10102        | Xylene (Total)              | 1330-20-7           | 4 J          | 0.9                        | 0.83            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 840          | 7.2          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 1,400        | 3.6          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 1,000        | 3.6          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 1,400        | 5.7          | 20 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 1,800        | 21           | 10 |
| 00941        | Chrysene             | 218-01-9           | 4,800        | 21           | 10 |
| 00941        | Fluorene             | 86-73-7            | 1,000        | 36           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 4,100        | 14           | 10 |
| 00941        | Pyrene               | 129-00-0           | 4,500        | 36           | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg. The blank value was not subtracted from the analytical result.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 233          | 0.638        | 1 |

|                      |                    |          |          |   |
|----------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture       | n.a.               | 6.9      | 0.50     | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.



**Sample Description: SS-5 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955222  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:15 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-05

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:15       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:15       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 10:15       | Client Supplied     | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101092AA    | 04/20/2010 04:29       | Angela D Sneeringer | 0.83            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 19:33       | Mark A Clark        | 10              |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/28/2010 09:27       | Mark A Clark        | 20              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard   | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 01:57       | Tara L Snyder       | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners    | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher    | 1               |

**Sample Description: SS-6 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955223**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:30 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-06

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 28           | 0.5                        | 0.84            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 0.9                        | 0.84            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 0.9                        | 0.84            |
| 10102        | Ethylbenzene                | 100-41-4            | 2 J          | 0.9                        | 0.84            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 0.9                        | 0.84            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | 2 J          | 0.5                        | 0.84            |
| 10102        | Naphthalene                 | 91-20-3             | 18           | 0.9                        | 0.84            |
| 10102        | Toluene                     | 108-88-3            | 7            | 0.9                        | 0.84            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 16           | 0.9                        | 0.84            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 11           | 0.9                        | 0.84            |
| 10102        | Xylene (Total)              | 1330-20-7           | 9            | 0.9                        | 0.84            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 420          | 15           | 20 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 690          | 7.3          | 20 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 540          | 7.3          | 20 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 800          | 5.8          | 20 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 940          | 44           | 20 |
| 00941        | Chrysene             | 218-01-9           | 2,500        | 44           | 20 |
| 00941        | Fluorene             | 86-73-7            | 460          | 73           | 20 |
| 00941        | Phenanthrene         | 85-01-8            | 1,500        | 29           | 20 |
| 00941        | Pyrene               | 129-00-0           | N.D.         | 2,300        | 20 |

The following compounds were detected in the method blank at the respective concentrations of:

Phenanthrene (1.54 ug/kg)  
Benzo(b)fluoranthene (0.36 ug/kg)

These blank values were not subtracted from the analytical results.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for Pyrene. The reporting limit for this compound was raised accordingly.

|                      |                     |              |              |   |
|----------------------|---------------------|--------------|--------------|---|
| <b>Metals</b>        | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead           | 7439-92-1           | 169          | 0.651        | 1 |
| <b>Wet Chemistry</b> | <b>SM20 2540 G</b>  | <b>%</b>     | <b>%</b>     |   |
| 00111 Moisture       | n.a.                | 8.8          | 0.50         | 1 |

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

**Sample Description: SS-6 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955223  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:30 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-06

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:30       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 10:30       | Client Supplied     | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101092AA    | 04/20/2010 04:52       | Angela D Sneeringer | 0.84            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10109SLB026  | 04/23/2010 14:40       | Mark A Clark        | 20              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 1      | 10109SLB026  | 04/19/2010 15:00       | Doreen K Robles     | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 02:00       | Tara L Snyder       | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners    | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher    | 1               |



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Page 1 of 2

**Sample Description:** SS-7 Grab Soil Sample  
West Yard Surface Sampling

LLI Sample # SW 5955224  
LLI Group # 1190562  
Account # 11183

**Project Name:** West Yard Surface Sampling

Collected: 04/15/2010 10:45 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-07

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 7            | 0.6                        | 1.05            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 1.05            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 1.05            |
| 10102        | Ethylbenzene                | 100-41-4            | 2 J          | 1                          | 1.05            |
| 10102        | Isopropylbenzene            | 98-82-8             | 3 J          | 1                          | 1.05            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.6                        | 1.05            |
| 10102        | Naphthalene                 | 91-20-3             | 48           | 1                          | 1.05            |
| 10102        | Toluene                     | 108-88-3            | 1 J          | 1                          | 1.05            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 220          | 1                          | 1.05            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 86           | 1                          | 1.05            |
| 10102        | Xylene (Total)              | 1330-20-7           | 24           | 1                          | 1.05            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample. A surrogate recovery was also outside of QC limits for the re-analysis.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 160          | 7.8          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 300          | 3.9          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 300          | 3.9          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 390          | 3.1          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 790          | 23           | 10 |
| 00941        | Chrysene             | 218-01-9           | 790          | 23           | 10 |
| 00941        | Fluorene             | 86-73-7            | 230          | 39           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 790          | 16           | 10 |
| 00941        | Pyrene               | 129-00-0           | 740          | 39           | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg. The blank value was not subtracted from the analytical result.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 440          | 0.671        | 1 |

|                                                                                                                                                                       |                    |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 14.0     | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description: SS-7 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample # SW 5955224**  
**LLI Group # 1190562**  
**Account # 11183**

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 10:45 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-07

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst             | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|---------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:45       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 10:45       | Client Supplied     | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 10:45       | Client Supplied     | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101092AA    | 04/20/2010 05:14       | Angela D Sneeringer | 1.05            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 20:58       | Mark A Clark        | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard   | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 02:03       | Tara L Snyder       | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners    | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher    | 1               |



**Sample Description: SS-8 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955225  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 11:00 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-08

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 1 J          | 0.5                        | 0.99            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 0.99            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 0.99            |
| 10102        | Ethylbenzene                | 100-41-4            | N.D.         | 1                          | 0.99            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 0.99            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                        | 0.99            |
| 10102        | Naphthalene                 | 91-20-3             | 2 J          | 1                          | 0.99            |
| 10102        | Toluene                     | 108-88-3            | N.D.         | 1                          | 0.99            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.         | 1                          | 0.99            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.         | 1                          | 0.99            |
| 10102        | Xylene (Total)              | 1330-20-7           | N.D.         | 1                          | 0.99            |

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 200          | 6.8          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 270          | 3.4          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 270          | 3.4          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 340          | 2.7          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 550          | 20           | 10 |
| 00941        | Chrysene             | 218-01-9           | 900          | 20           | 10 |
| 00941        | Fluorene             | 86-73-7            | 290          | 34           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 1,300        | 14           | 10 |
| 00941        | Pyrene               | 129-00-0           | N.D.         | 550          | 10 |

The following compounds were detected in the method blank at the respective concentrations of:

Phenanthrene (1.54 ug/kg)  
Benzo(b)fluoranthene (0.36 ug/kg)

These blank values were not subtracted from the analytical results.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for Pyrene. The reporting limit for this compound was raised accordingly.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 96.8         | 0.610        | 1 |

|                                                                                                                                                                       |                    |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 1.7      | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description: SS-8 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955225  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 11:00 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-08

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 11:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 11:00       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 11:00       | Client Supplied  | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/19/2010 00:16       | Nicholas P Riehl | 0.99            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10109SLB026  | 04/23/2010 16:52       | Mark A Clark     | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 1      | 10109SLB026  | 04/19/2010 15:00       | Doreen K Robles  | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 02:07       | Tara L Snyder    | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher | 1               |



# Analysis Report

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Page 1 of 2

**Sample Description:** SS-9 Grab Soil Sample  
West Yard Surface Sampling

**LLI Sample #** SW 5955226  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name:** West Yard Surface Sampling

**Collected:** 04/15/2010 11:15 by TC

Sunoco c/o Stantec

**Submitted:** 04/15/2010 16:00

1060 Andrew Drive

**Reported:** 04/28/2010 12:55

Suite 140

**Discard:** 06/28/2010

West Chester PA 19380

WY-09

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 2 J          | 0.5                        | 1.02            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 1.02            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 1.02            |
| 10102        | Ethylbenzene                | 100-41-4            | N.D.         | 1                          | 1.02            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 1.02            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                        | 1.02            |
| 10102        | Naphthalene                 | 91-20-3             | 11           | 1                          | 1.02            |
| 10102        | Toluene                     | 108-88-3            | 1 J          | 1                          | 1.02            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | 6            | 1                          | 1.02            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | 2 J          | 1                          | 1.02            |
| 10102        | Xylene (Total)              | 1330-20-7           | 1 J          | 1                          | 1.02            |

The GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis and the re-analysis. The values reported here are from the initial analysis of the sample.

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 150          | 6.8          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 420          | 3.4          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 430          | 3.4          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 470          | 2.7          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 810          | 20           | 10 |
| 00941        | Chrysene             | 218-01-9           | 980          | 20           | 10 |
| 00941        | Fluorene             | 86-73-7            | 190          | 34           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 1,100        | 14           | 10 |
| 00941        | Pyrene               | 129-00-0           | 890          | 34           | 10 |

The following compounds were detected in the method blank at the respective concentrations of:

Phenanthrene (1.54 ug/kg)  
Benzo(b)fluoranthene (0.36 ug/kg)

These blank values were not subtracted from the analytical results.

|               |                     |              |              |       |
|---------------|---------------------|--------------|--------------|-------|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |       |
| 06955         | Lead                | 7439-92-1    | 111          | 0.592 |

|                                                                                                                                                                       |                    |          |          |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|------|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |      |
| 00111                                                                                                                                                                 | Moisture           | n.a.     | 1.6      | 0.50 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |      |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

**Sample Description: SS-9 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955226  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 11:15 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-09

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst          | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|------------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC  | SW-846 5035  | 1      | 201010620842 | 04/15/2010 11:15       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 11:15       | Client Supplied  | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 11:15       | Client Supplied  | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/18/2010 20:53       | Nicholas P Riehl | 1.02            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10109SLB026  | 04/23/2010 18:17       | Mark A Clark     | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 1      | 10109SLB026  | 04/19/2010 15:00       | Doreen K Robles  | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 02:10       | Tara L Snyder    | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher | 1               |



# Analysis Report

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Page 1 of 2

**Sample Description:** SS-10 Grab Soil Sample  
West Yard Surface Sampling

LLI Sample # SW 5955227  
LLI Group # 1190562  
Account # 11183

**Project Name:** West Yard Surface Sampling

Collected: 04/15/2010 11:30 by TC

Sunoco c/o Stantec

Submitted: 04/15/2010 16:00

1060 Andrew Drive

Reported: 04/28/2010 12:55

Suite 140

Discard: 06/28/2010

West Chester PA 19380

WY-10

| CAT No.      | Analysis Name               | CAS Number          | Dry Result   | Dry Method Detection Limit | Dilution Factor |
|--------------|-----------------------------|---------------------|--------------|----------------------------|-----------------|
| <b>GC/MS</b> | <b>Volatiles</b>            | <b>SW-846 8260B</b> | <b>ug/kg</b> | <b>ug/kg</b>               |                 |
| 10102        | Benzene                     | 71-43-2             | 3 J          | 0.5                        | 0.95            |
| 10102        | 1,2-Dibromoethane           | 106-93-4            | N.D.         | 1                          | 0.95            |
| 10102        | 1,2-Dichloroethane          | 107-06-2            | N.D.         | 1                          | 0.95            |
| 10102        | Ethylbenzene                | 100-41-4            | N.D.         | 1                          | 0.95            |
| 10102        | Isopropylbenzene            | 98-82-8             | N.D.         | 1                          | 0.95            |
| 10102        | Methyl Tertiary Butyl Ether | 1634-04-4           | N.D.         | 0.5                        | 0.95            |
| 10102        | Naphthalene                 | 91-20-3             | 2 J          | 1                          | 0.95            |
| 10102        | Toluene                     | 108-88-3            | N.D.         | 1                          | 0.95            |
| 10102        | 1,2,4-Trimethylbenzene      | 95-63-6             | N.D.         | 1                          | 0.95            |
| 10102        | 1,3,5-Trimethylbenzene      | 108-67-8            | N.D.         | 1                          | 0.95            |
| 10102        | Xylene (Total)              | 1330-20-7           | N.D.         | 1                          | 0.95            |

|              |                      |                    |              |              |    |
|--------------|----------------------|--------------------|--------------|--------------|----|
| <b>GC/MS</b> | <b>Semivolatiles</b> | <b>SW-846 8310</b> | <b>ug/kg</b> | <b>ug/kg</b> |    |
| 00941        | Anthracene           | 120-12-7           | 170          | 6.7          | 10 |
| 00941        | Benzo(a)anthracene   | 56-55-3            | 350          | 3.4          | 10 |
| 00941        | Benzo(a)pyrene       | 50-32-8            | 410          | 3.4          | 10 |
| 00941        | Benzo(b)fluoranthene | 205-99-2           | 430          | 2.7          | 10 |
| 00941        | Benzo(g,h,i)perylene | 191-24-2           | 820          | 20           | 10 |
| 00941        | Chrysene             | 218-01-9           | 1,000        | 20           | 10 |
| 00941        | Fluorene             | 86-73-7            | 260          | 34           | 10 |
| 00941        | Phenanthrene         | 85-01-8            | 1,200        | 13           | 10 |
| 00941        | Pyrene               | 129-00-0           | 800          | 34           | 10 |

Phenanthrene was detected in the method blank at a concentration of 1.46 ug/kg.  
The blank value was not subtracted from the analytical result.

|               |                     |              |              |   |
|---------------|---------------------|--------------|--------------|---|
| <b>Metals</b> | <b>SW-846 6010B</b> | <b>mg/kg</b> | <b>mg/kg</b> |   |
| 06955 Lead    | 7439-92-1           | 116          | 0.601        | 1 |

|                                                                                                                                                                       |                    |          |          |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|----------|---|
| <b>Wet Chemistry</b>                                                                                                                                                  | <b>SM20 2540 G</b> | <b>%</b> | <b>%</b> |   |
| 00111 Moisture                                                                                                                                                        | n.a.               | 1.2      | 0.50     | 1 |
| "Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis. |                    |          |          |   |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                | Method      | Trial# | Batch#       | Analysis Date and Time | Analyst         | Dilution Factor |
|---------|------------------------------|-------------|--------|--------------|------------------------|-----------------|-----------------|
| 07579   | GC/MS-Field PreservedMeOH-NC | SW-846 5035 | 1      | 201010620842 | 04/15/2010 11:30       | Client Supplied | 1               |



**Sample Description: SS-10 Grab Soil Sample**  
**West Yard Surface Sampling**

**LLI Sample #** SW 5955227  
**LLI Group #** 1190562  
**Account #** 11183

**Project Name: West Yard Surface Sampling**

Collected: 04/15/2010 11:30 by TC

Sunoco c/o Stantec

1060 Andrew Drive

Submitted: 04/15/2010 16:00

Suite 140

Reported: 04/28/2010 12:55

West Chester PA 19380

Discard: 06/28/2010

WY-10

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name                 | Method       | Trial# | Batch#       | Analysis Date and Time | Analyst           | Dilution Factor |
|---------|-------------------------------|--------------|--------|--------------|------------------------|-------------------|-----------------|
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 1      | 201010620842 | 04/15/2010 11:30       | Client Supplied   | 1               |
| 02392   | L/H Field Preserved Bisulfate | SW-846 5035  | 2      | 201010620842 | 04/15/2010 11:30       | Client Supplied   | 1               |
| 10102   | UST - Soils by 8260B          | SW-846 8260B | 1      | X101081AA    | 04/18/2010 21:16       | Nicholas P Riehl  | 0.95            |
| 00941   | PAH's in Solids by HPLC       | SW-846 8310  | 1      | 10116SLE026  | 04/27/2010 21:44       | Mark A Clark      | 10              |
| 03338   | PAH Solid Extraction          | SW-846 3550B | 2      | 10116SLE026  | 04/26/2010 17:15       | Sally L Appleyard | 1               |
| 06955   | Lead                          | SW-846 6010B | 1      | 101065708003 | 04/20/2010 02:13       | Tara L Snyder     | 1               |
| 05708   | SW SW846 ICP Digest           | SW-846 3050B | 1      | 101065708003 | 04/19/2010 08:55       | Denise K Conners  | 1               |
| 00111   | Moisture                      | SM20 2540 G  | 1      | 10106820003B | 04/16/2010 15:45       | Scott W Freisher  | 1               |

## Quality Control Summary

Client Name: Sunoco c/o Stantec  
Reported: 04/28/10 at 12:55 PM

Group Number: 1190562

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

| Analysis Name                                                | Blank Result | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|--------------------------------------------------------------|--------------|-----------|--------------|----------|-----------|-----------------|-----|---------|
| Batch number: R101091AA                                      |              |           |              |          |           |                 |     |         |
| Sample number(s): 5955218, 5955221                           |              |           |              |          |           |                 |     |         |
| Naphthalene                                                  | N.D.         | 50.       | ug/kg        | 80       | 80        | 59-123          | 0   | 30      |
| 1,2,4-Trimethylbenzene                                       | N.D.         | 50.       | ug/kg        | 98       | 93        | 79-120          | 5   | 30      |
| 1,3,5-Trimethylbenzene                                       | N.D.         | 50.       | ug/kg        | 94       | 89        | 78-120          | 6   | 30      |
| Batch number: X101081AA                                      |              |           |              |          |           |                 |     |         |
| Sample number(s): 5955218-5955220, 5955225-5955227           |              |           |              |          |           |                 |     |         |
| Benzene                                                      | N.D.         | 0.5       | ug/kg        | 99       | 99        | 80-120          | 0   | 30      |
| 1,2-Dibromoethane                                            | N.D.         | 1.        | ug/kg        | 90       | 87        | 80-120          | 4   | 30      |
| 1,2-Dichloroethane                                           | N.D.         | 1.        | ug/kg        | 93       | 91        | 71-129          | 2   | 30      |
| Ethylbenzene                                                 | N.D.         | 1.        | ug/kg        | 100      | 100       | 80-120          | 0   | 30      |
| Isopropylbenzene                                             | N.D.         | 1.        | ug/kg        | 99       | 101       | 76-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                  | N.D.         | 0.5       | ug/kg        | 109      | 108       | 74-121          | 1   | 30      |
| Naphthalene                                                  | N.D.         | 1.        | ug/kg        | 82       | 81        | 59-123          | 1   | 30      |
| Toluene                                                      | N.D.         | 1.        | ug/kg        | 102      | 102       | 80-120          | 0   | 30      |
| 1,2,4-Trimethylbenzene                                       | N.D.         | 1.        | ug/kg        | 100      | 101       | 79-120          | 1   | 30      |
| 1,3,5-Trimethylbenzene                                       | N.D.         | 1.        | ug/kg        | 99       | 98        | 78-120          | 0   | 30      |
| Xylene (Total)                                               | N.D.         | 1.        | ug/kg        | 94       | 95        | 80-120          | 0   | 30      |
| Batch number: X101092AA                                      |              |           |              |          |           |                 |     |         |
| Sample number(s): 5955221-5955224                            |              |           |              |          |           |                 |     |         |
| Benzene                                                      | N.D.         | 0.5       | ug/kg        | 95       | 94        | 80-120          | 1   | 30      |
| 1,2-Dibromoethane                                            | N.D.         | 1.        | ug/kg        | 84       | 86        | 80-120          | 2   | 30      |
| 1,2-Dichloroethane                                           | N.D.         | 1.        | ug/kg        | 90       | 90        | 71-129          | 0   | 30      |
| Ethylbenzene                                                 | N.D.         | 1.        | ug/kg        | 94       | 93        | 80-120          | 0   | 30      |
| Isopropylbenzene                                             | N.D.         | 1.        | ug/kg        | 95       | 94        | 76-120          | 1   | 30      |
| Methyl Tertiary Butyl Ether                                  | N.D.         | 0.5       | ug/kg        | 105      | 108       | 74-121          | 3   | 30      |
| Naphthalene                                                  | N.D.         | 1.        | ug/kg        | 78       | 78        | 59-123          | 0   | 30      |
| Toluene                                                      | N.D.         | 1.        | ug/kg        | 95       | 96        | 80-120          | 2   | 30      |
| 1,2,4-Trimethylbenzene                                       | N.D.         | 1.        | ug/kg        | 96       | 95        | 79-120          | 1   | 30      |
| 1,3,5-Trimethylbenzene                                       | N.D.         | 1.        | ug/kg        | 94       | 92        | 78-120          | 3   | 30      |
| Xylene (Total)                                               | N.D.         | 1.        | ug/kg        | 90       | 89        | 80-120          | 1   | 30      |
| Batch number: 10109SLB026                                    |              |           |              |          |           |                 |     |         |
| Sample number(s): 5955219, 5955223, 5955225-5955226          |              |           |              |          |           |                 |     |         |
| Anthracene                                                   | N.D.         | 0.67      | ug/kg        | 88       |           | 71-105          |     |         |
| Benzo(a)anthracene                                           | N.D.         | 0.33      | ug/kg        | 91       |           | 74-111          |     |         |
| Benzo(a)pyrene                                               | N.D.         | 0.33      | ug/kg        | 87       |           | 65-106          |     |         |
| Benzo(b)fluoranthene                                         | 0.36 J       | 0.27      | ug/kg        | 95       |           | 75-113          |     |         |
| Benzo(g,h,i)perylene                                         | N.D.         | 2.0       | ug/kg        | 104      |           | 75-112          |     |         |
| Chrysene                                                     | N.D.         | 2.0       | ug/kg        | 102      |           | 74-112          |     |         |
| Fluorene                                                     | N.D.         | 3.3       | ug/kg        | 101      |           | 75-111          |     |         |
| Phenanthrene                                                 | 1.5 J        | 1.3       | ug/kg        | 103      |           | 77-111          |     |         |
| Pyrene                                                       | N.D.         | 3.3       | ug/kg        | 102      |           | 71-109          |     |         |
| Batch number: 10116SLE026                                    |              |           |              |          |           |                 |     |         |
| Sample number(s): 5955218, 5955220-5955222, 5955224, 5955227 |              |           |              |          |           |                 |     |         |
| Anthracene                                                   | N.D.         | 0.67      | ug/kg        | 86       |           | 71-105          |     |         |
| Benzo(a)anthracene                                           | N.D.         | 0.33      | ug/kg        | 88       |           | 74-111          |     |         |
| Benzo(a)pyrene                                               | N.D.         | 0.33      | ug/kg        | 83       |           | 65-106          |     |         |
| Benzo(b)fluoranthene                                         | N.D.         | 0.27      | ug/kg        | 91       |           | 75-113          |     |         |

\*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Sunoco c/o Stantec

Group Number: 1190562

Reported: 04/28/10 at 12:55 PM

### Laboratory Compliance Quality Control

| <u>Analysis Name</u>       | <u>Blank Result</u>               | <u>Blank MDL</u> | <u>Report Units</u> | <u>LCS %REC</u> | <u>LCSD %REC</u> | <u>LCS/LCSD Limits</u> | <u>RPD</u> | <u>RPD Max</u> |
|----------------------------|-----------------------------------|------------------|---------------------|-----------------|------------------|------------------------|------------|----------------|
| Benzo(g,h,i)perylene       | N.D.                              | 2.0              | ug/kg               | 96              |                  | 75-112                 |            |                |
| Chrysene                   | N.D.                              | 2.0              | ug/kg               | 96              |                  | 74-112                 |            |                |
| Fluorene                   | N.D.                              | 3.3              | ug/kg               | 96              |                  | 75-111                 |            |                |
| Phenanthrene               | 1.5 J                             | 1.3              | ug/kg               | 98              |                  | 77-111                 |            |                |
| Pyrene                     | N.D.                              | 3.3              | ug/kg               | 97              |                  | 71-109                 |            |                |
| Batch number: 101065708003 | Sample number(s): 5955218-5955227 |                  |                     |                 |                  |                        |            |                |
| Lead                       | N.D.                              | 0.600            | mg/kg               | 96              |                  | 80-120                 |            |                |
| Batch number: 10106820003B | Sample number(s): 5955218-5955227 |                  |                     |                 |                  |                        |            |                |
| Moisture                   |                                   |                  |                     | 100             |                  | 99-101                 |            |                |

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>        | <u>MS %REC</u>                                                     | <u>MSD %REC</u> | <u>MS/MSD Limits</u> | <u>RPD</u> | <u>RPD MAX</u> | <u>BKG Conc</u> | <u>DUP Conc</u> | <u>DUP RPD</u> | <u>Dup RPD Max</u> |
|-----------------------------|--------------------------------------------------------------------|-----------------|----------------------|------------|----------------|-----------------|-----------------|----------------|--------------------|
| Batch number: X101081AA     | Sample number(s): 5955218-5955220, 5955225-5955227 UNSPK: 5955227  |                 |                      |            |                |                 |                 |                |                    |
| Benzene                     | 92                                                                 |                 | 55-143               |            |                |                 |                 |                |                    |
| 1,2-Dibromoethane           | 79                                                                 |                 | 54-129               |            |                |                 |                 |                |                    |
| 1,2-Dichloroethane          | 83                                                                 |                 | 53-143               |            |                |                 |                 |                |                    |
| Ethylbenzene                | 95                                                                 |                 | 44-141               |            |                |                 |                 |                |                    |
| Isopropylbenzene            | 88                                                                 |                 | 38-144               |            |                |                 |                 |                |                    |
| Methyl Tertiary Butyl Ether | 129                                                                |                 | 55-129               |            |                |                 |                 |                |                    |
| Naphthalene                 | 61                                                                 |                 | 10-138               |            |                |                 |                 |                |                    |
| Toluene                     | 113                                                                |                 | 50-146               |            |                |                 |                 |                |                    |
| 1,2,4-Trimethylbenzene      | 132                                                                |                 | 37-149               |            |                |                 |                 |                |                    |
| 1,3,5-Trimethylbenzene      | 127                                                                |                 | 38-150               |            |                |                 |                 |                |                    |
| Xylene (Total)              | 90                                                                 |                 | 44-136               |            |                |                 |                 |                |                    |
| Batch number: X101092AA     | Sample number(s): 5955221-5955224 UNSPK: P956799                   |                 |                      |            |                |                 |                 |                |                    |
| Benzene                     | 91                                                                 |                 | 55-143               |            |                |                 |                 |                |                    |
| 1,2-Dibromoethane           | 94                                                                 |                 | 54-129               |            |                |                 |                 |                |                    |
| 1,2-Dichloroethane          | 95                                                                 |                 | 53-143               |            |                |                 |                 |                |                    |
| Ethylbenzene                | 88                                                                 |                 | 44-141               |            |                |                 |                 |                |                    |
| Isopropylbenzene            | 88                                                                 |                 | 38-144               |            |                |                 |                 |                |                    |
| Methyl Tertiary Butyl Ether | 116                                                                |                 | 55-129               |            |                |                 |                 |                |                    |
| Naphthalene                 | 84                                                                 |                 | 10-138               |            |                |                 |                 |                |                    |
| Toluene                     | 91                                                                 |                 | 50-146               |            |                |                 |                 |                |                    |
| 1,2,4-Trimethylbenzene      | 90                                                                 |                 | 37-149               |            |                |                 |                 |                |                    |
| 1,3,5-Trimethylbenzene      | 90                                                                 |                 | 38-150               |            |                |                 |                 |                |                    |
| Xylene (Total)              | 86                                                                 |                 | 44-136               |            |                |                 |                 |                |                    |
| Batch number: 10109SLB026   | Sample number(s): 5955219, 5955223, 5955225-5955226 UNSPK: P09LBUS |                 |                      |            |                |                 |                 |                |                    |
| Anthracene                  | 134*                                                               | 478*            | 71-107               | 50         | 50             |                 |                 |                |                    |
| Benzo(a)anthracene          | 56                                                                 | 287*            | 22-67                | 48         | 50             |                 |                 |                |                    |
| Benzo(a)pyrene              | 92 (2)                                                             | 393 (2)         | 60-122               | 42         | 50             |                 |                 |                |                    |
| Benzo(b)fluoranthene        | 185 (2)                                                            | 770 (2)         | 23-157               | 45         | 50             |                 |                 |                |                    |
| Benzo(g,h,i)perylene        | 51                                                                 | 153*            | 46-138               | 47         | 50             |                 |                 |                |                    |
| Chrysene                    | 177 (2)                                                            | 647 (2)         | 64-108               | 42         | 50             |                 |                 |                |                    |

\*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Sunoco c/o Stantec

Group Number: 1190562

Reported: 04/28/10 at 12:55 PM

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Background (BKG) = the sample used in conjunction with the duplicate

| <u>Analysis Name</u>       | <u>MS</u><br><u>%REC</u>                                                    | <u>MSD</u><br><u>%REC</u> | <u>MS/MSD</u><br><u>Limits</u> | <u>RPD</u><br><u>MAX</u> | <u>BKG</u><br><u>Conc</u> | <u>DUP</u><br><u>Conc</u> | <u>DUP</u><br><u>RPD</u> | <u>Dup RPD</u><br><u>Max</u> |
|----------------------------|-----------------------------------------------------------------------------|---------------------------|--------------------------------|--------------------------|---------------------------|---------------------------|--------------------------|------------------------------|
| Fluorene                   | 76                                                                          | 184*                      | 71-117                         | 47                       | 50                        |                           |                          |                              |
| Phenanthrene               | 347 (2)                                                                     | 1202 (2)                  | 61-127                         | 48                       | 50                        |                           |                          |                              |
| Pyrene                     | 126 (2)                                                                     | 495 (2)                   | 67-119                         | 47                       | 50                        |                           |                          |                              |
| Batch number: 10116SLE026  | Sample number(s): 5955218, 5955220-5955222, 5955224, 5955227 UNSPK: 5955218 |                           |                                |                          |                           |                           |                          |                              |
| Anthracene                 | 625 (2)                                                                     | -197 (2)                  | 71-107                         | 91*                      | 50                        |                           |                          |                              |
| Benzo(a)anthracene         | 999 (2)                                                                     | -267 (2)                  | 22-67                          | 120*                     | 50                        |                           |                          |                              |
| Benzo(a)pyrene             | 1581 (2)                                                                    | -439 (2)                  | 60-122                         | 122*                     | 50                        |                           |                          |                              |
| Benzo(b)fluoranthene       | 1470 (2)                                                                    | -715 (2)                  | 23-157                         | 103*                     | 50                        |                           |                          |                              |
| Benzo(g,h,i)perylene       | 224*                                                                        | -68*                      | 46-138                         | 89*                      | 50                        |                           |                          |                              |
| Chrysene                   | 392 (2)                                                                     | -405 (2)                  | 64-108                         | 55*                      | 50                        |                           |                          |                              |
| Fluorene                   | 123*                                                                        | -6*                       | 71-117                         | 51*                      | 50                        |                           |                          |                              |
| Phenanthrene               | 1325 (2)                                                                    | -564 (2)                  | 61-127                         | 86*                      | 50                        |                           |                          |                              |
| Pyrene                     | -274 (2)                                                                    | -283 (2)                  | 67-119                         | 1                        | 50                        |                           |                          |                              |
| Batch number: 101065708003 | Sample number(s): 5955218-5955227 UNSPK: P955451 BKG: P955451               |                           |                                |                          |                           |                           |                          |                              |
| Lead                       | 116                                                                         | 88                        | 75-125                         | 6                        | 20                        | 51.7                      | 52.2                     | 1 20                         |
| Batch number: 10106820003B | Sample number(s): 5955218-5955227 BKG: P955121                              |                           |                                |                          |                           |                           |                          |                              |
| Moisture                   |                                                                             |                           |                                |                          | 10.8                      | 10.9                      | 1                        | 15                           |

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 8260 Master Scan (soil)

Batch number: R101091AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| Blank   | 95                   | 98                    | 87         | 84                   |
| LCS     | 95                   | 101                   | 88         | 87                   |
| LCSD    | 94                   | 96                    | 87         | 86                   |
| Limits: | 71-114               | 70-109                | 70-123     | 70-111               |

Analysis Name: UST - Soils by 8260B

Batch number: X101081AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 5955218 | 110                  | 122*                  | 112        | 50*                  |
| 5955219 | 99                   | 104                   | 106        | 62*                  |

\*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Sunoco c/o Stantec

Group Number: 1190562

Reported: 04/28/10 at 12:55 PM

### Surrogate Quality Control

|         |     |      |     |     |
|---------|-----|------|-----|-----|
| 5955220 | 106 | 111* | 119 | 47* |
| 5955225 | 91  | 97   | 89  | 81  |
| 5955226 | 93  | 95   | 109 | 68* |
| 5955227 | 90  | 97   | 88  | 85  |
| Blank   | 89  | 86   | 86  | 84  |
| LCS     | 88  | 89   | 93  | 88  |
| LCSD    | 88  | 88   | 93  | 88  |
| MS      | 93  | 98   | 108 | 72  |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: UST - Soils by 8260B

Batch number: X101092AA

|         | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---------|----------------------|-----------------------|------------|----------------------|
| 5955221 | 106                  | 113*                  | 113        | 55*                  |
| 5955222 | 95                   | 101                   | 96         | 64*                  |
| 5955223 | 96                   | 104                   | 100        | 56*                  |
| 5955224 | 92                   | 96                    | 90         | 74                   |
| Blank   | 88                   | 88                    | 85         | 86                   |
| LCS     | 87                   | 88                    | 93         | 88                   |
| LCSD    | 87                   | 88                    | 93         | 88                   |
| MS      | 89                   | 94                    | 93         | 89                   |

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| Limits: | 71-114 | 70-109 | 70-123 | 70-111 |
|---------|--------|--------|--------|--------|

Analysis Name: PAH's in Solids by HPLC

Batch number: 10109SLB026

|         | Nitrobenzene | Triphenylene |
|---------|--------------|--------------|
| 5955219 | 65           | 88           |
| 5955223 | 61           | 113          |
| 5955225 | 68           | 78           |
| 5955226 | 76           | 93           |
| Blank   | 91           | 104          |
| LCS     | 97           | 113          |
| MS      | 57*          | 113          |
| MSD     | 82           | 197*         |

|         |        |        |
|---------|--------|--------|
| Limits: | 59-118 | 58-142 |
|---------|--------|--------|

Analysis Name: PAH's in Solids by HPLC

Batch number: 10116SLE026

|         | Nitrobenzene | Triphenylene |
|---------|--------------|--------------|
| 5955218 | 72           | 289*         |
| 5955220 | 90           | 294*         |
| 5955221 | 83           | 146*         |
| 5955222 | 98           | 202*         |
| 5955224 | 83           | 60           |
| 5955227 | 91           | 83           |
| Blank   | 93           | 104          |
| LCS     | 94           | 107          |
| MS      | 84           | 279*         |
| MSD     | 65           | 210*         |

|         |        |        |
|---------|--------|--------|
| Limits: | 59-118 | 58-142 |
|---------|--------|--------|

\*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



## Quality Control Summary

Client Name: Sunoco c/o Stantec  
Reported: 04/28/10 at 12:55 PM

Group Number: 1190562

## Surrogate Quality Control

\*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.



Lancaster  
Laboratories

For Lancaster Laboratories use only  
Acct. # 11183 Group# 1190562 Sample # 5955218-27 **COC #** 232544

 $2.8^\circ$ 

FSC: \_\_\_\_\_  
SCR#: \_\_\_\_\_

**H=HCl**      **T=Thiosulfate**  
**N=HNO<sub>3</sub>**    **B=NaOH**  
**S=H<sub>2</sub>SO<sub>4</sub>**    **O=Other**

temperature of samples  
non receipt (if requested)

|                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                           |                |                                                                                                                                                   |           |      |       |       |                       |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|-------|-------|-----------------------|------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------|--|--|--|--|--|--|--|
| <b>1</b> Client: <u>Stantec</u> Acct. #: _____<br>Project Name/ID: <u>West Yard surface Sampling</u> PWSID #: _____<br>Project Manager: <u>J. Mengis / A. Carter</u> P.O. #: _____<br>Sampler: <u>T. Charrington</u> Quote #: _____<br>Name of state where samples were collected: _____                                                              |  | <b>4</b> Matrix<br><input type="checkbox"/> Potable<br><input type="checkbox"/> Check if NPDES Applicable |                | <b>5</b> Analyses Requested<br>Preservation Codes<br>H=HCl T=Thiosulfate<br>N=HNO <sub>3</sub> B=NaOH<br>S=H <sub>2</sub> SO <sub>4</sub> O=Other |           |      |       |       |                       |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | <b>6</b> Temperature of samples upon receipt (if requested) |  |  |  |  |  |  |  |
| <b>2</b> Sample Identification                                                                                                                                                                                                                                                                                                                        |  | <b>3</b> Date Collected                                                                                   | Time Collected | Grab                                                                                                                                              | Composite | Soil | Water | Other | Total # of Containers | Remarks                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-1                                                                                                                                                                                                                                                                                                                                                  |  | 4/15/10                                                                                                   | 0915           | X                                                                                                                                                 |           | X    |       |       | 4                     | PADEP / cold gasoline  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-2                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 0930           | X                                                                                                                                                 |           | X    |       |       | 4                     | Fuel oil, (2, 4, 5, 6) |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-3                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 0945           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-4                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1000           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-5                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1015           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-6                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1030           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-7                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1045           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-8                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1100           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-9                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                           | 1115           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| SS-10                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                                           | 1130           | X                                                                                                                                                 |           | X    |       |       | 4                     |                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                             |  |  |  |  |  |  |  |
| <b>7</b> Turnaround Time Requested (TAT) (please circle): <u>Normal</u> Rush<br>(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)<br>Date results are needed: _____<br>Rush results requested by (please circle): Phone Fax E-mail<br>Phone #: _____ Fax #: _____<br>E-mail address: _____                                      |  |                                                                                                           |                |                                                                                                                                                   |           |      |       |       |                       |                        |  | Relinquished by: <u>[Signature]</u> Date <u>4/15/10</u> Time <u>1:35</u> Received by: <u>[Signature]</u> Date <u>4/15/10</u> Time <u>1:45</u><br>Relinquished by: <u>[Signature]</u> Date <u>4/15/10</u> Time <u>1:00</u> Received by: _____ Date _____ Time _____<br>Relinquished by: _____ Date _____ Time _____ Received by: _____ Date _____ Time _____<br>Relinquished by: _____ Date _____ Time _____ Received by: _____ Date _____ Time _____<br>Relinquished by: _____ Date _____ Time _____ Received by: <u>Katie Hartman</u> Date <u>4/15/10</u> Time <u>1:00</u> |  |                                                             |  |  |  |  |  |  |  |
| <b>8</b> Data Package Options (please circle if required)<br>Type I (validation/NJ Reg) TX TRRP-13<br>Type II (Tier II) MA MCP CT RCP<br>Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No<br>Type IV (CLP SOW) (If yes, indicate QC sample and submit triplicate volume.)<br>Type VI (Raw Data Only) Internal COC Required? Yes / No _____ |  |                                                                                                           |                |                                                                                                                                                   |           |      |       |       |                       |                        |  | SDG Complete? Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                             |  |  |  |  |  |  |  |

Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-8766  
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

## Lancaster Laboratories

### Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

|                         |                                                                                                                                                                                                                                                                                                                                                                    |                        |                                                |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------|
| <b>N.D.</b>             | none detected                                                                                                                                                                                                                                                                                                                                                      | <b>BMQL</b>            | Below Minimum Quantitation Level               |
| <b>TNTC</b>             | Too Numerous To Count                                                                                                                                                                                                                                                                                                                                              | <b>MPN</b>             | Most Probable Number                           |
| <b>IU</b>               | International Units                                                                                                                                                                                                                                                                                                                                                | <b>CP Units</b>        | cobalt-chloroplatinate units                   |
| <b>umhos/cm</b>         | micromhos/cm                                                                                                                                                                                                                                                                                                                                                       | <b>NTU</b>             | nephelometric turbidity units                  |
| <b>C</b>                | degrees Celsius                                                                                                                                                                                                                                                                                                                                                    | <b>F</b>               | degrees Fahrenheit                             |
| <b>Cal</b>              | (diet) calories                                                                                                                                                                                                                                                                                                                                                    | <b>lb.</b>             | pound(s)                                       |
| <b>meq</b>              | milliequivalents                                                                                                                                                                                                                                                                                                                                                   | <b>kg</b>              | kilogram(s)                                    |
| <b>g</b>                | gram(s)                                                                                                                                                                                                                                                                                                                                                            | <b>mg</b>              | milligram(s)                                   |
| <b>ug</b>               | microgram(s)                                                                                                                                                                                                                                                                                                                                                       | <b>l</b>               | liter(s)                                       |
| <b>ml</b>               | milliliter(s)                                                                                                                                                                                                                                                                                                                                                      | <b>ul</b>              | microliter(s)                                  |
| <b>m3</b>               | cubic meter(s)                                                                                                                                                                                                                                                                                                                                                     | <b>fib &gt;5 um/ml</b> | fibers greater than 5 microns in length per ml |
| <b>&lt;</b>             | less than – The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.                                                                                                                                                                                          |                        |                                                |
| <b>&gt;</b>             | greater than                                                                                                                                                                                                                                                                                                                                                       |                        |                                                |
| <b>ppm</b>              | parts per million – One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas. |                        |                                                |
| <b>ppb</b>              | parts per billion                                                                                                                                                                                                                                                                                                                                                  |                        |                                                |
| <b>Dry weight basis</b> | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.                                                                                                                                                                 |                        |                                                |

*U.S. EPA data qualifiers:*

#### Organic Qualifiers

|              |                                                                        |
|--------------|------------------------------------------------------------------------|
| <b>A</b>     | TIC is a possible aldol-condensation product                           |
| <b>B</b>     | Analyte was also detected in the blank                                 |
| <b>C</b>     | Pesticide result confirmed by GC/MS                                    |
| <b>D</b>     | Compound quantitated on a diluted sample                               |
| <b>E</b>     | Concentration exceeds the calibration range of the instrument          |
| <b>J</b>     | Estimated value                                                        |
| <b>N</b>     | Presumptive evidence of a compound (TICs only)                         |
| <b>P</b>     | Concentration difference between primary and confirmation columns >25% |
| <b>U</b>     | Compound was not detected                                              |
| <b>X,Y,Z</b> | Defined in case narrative                                              |

#### Inorganic Qualifiers

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>B</b> | Value is <CRDL, but ≥IDL                                |
| <b>E</b> | Estimated due to interference                           |
| <b>M</b> | Duplicate injection precision not met                   |
| <b>N</b> | Spike amount not within control limits                  |
| <b>S</b> | Method of standard additions (MSA) used for calculation |
| <b>U</b> | Compound was not detected                               |
| <b>W</b> | Post digestion spike out of control limits              |
| <b>*</b> | Duplicate analysis not within control limits            |
| <b>+</b> | Correlation coefficient for MSA <0.995                  |

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

**WARRANTY AND LIMITS OF LIABILITY** – In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions of Lancaster Laboratories and we hereby object to any conflicting terms contained in any acceptance or order submitted by client.

## **APPENDIX E**

### Groundwater Sampling Field Summary Report

Appendix E  
May 2011 Groundwater Sampling Field Summary  
AOI 10  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

| WELL INFO   |                          |                                         |                            |                        | FIELD READINGS (pre-purge) |            |           |          |      |                      | FIELD READINGS (post-purge) |                                         |                     |            |           |          |      |                      | FIELD READINGS (sampling) |             | Field Notes                                                                         |
|-------------|--------------------------|-----------------------------------------|----------------------------|------------------------|----------------------------|------------|-----------|----------|------|----------------------|-----------------------------|-----------------------------------------|---------------------|------------|-----------|----------|------|----------------------|---------------------------|-------------|-------------------------------------------------------------------------------------|
| Location ID | Depth to Bottom (ft bgs) | Depth to Water (ft btic) <sup>(1)</sup> | Depth to Product (ft btic) | Product Thickness (ft) | Purge Start                | Temp. (°C) | DO (mg/L) | ORP (mv) | pH   | Conductivity (mS/cm) | Purge Complete              | Approx. Purge Rate (gpm) <sup>(2)</sup> | Volume Purged (gal) | Temp. (°C) | DO (mg/L) | ORP (mv) | pH   | Conductivity (mS/cm) | Date Sampled              | Sample Time | Field Notes                                                                         |
| W-1         | 17.00                    | 6.21                                    | -                          | -                      | -                          | 13.31      | 3.82      | 67.90    | 6.20 | 0.58                 | 14:30                       | Hand bailed                             | -                   | 13.01      | 2.68      | 42.80    | 6.40 | 0.59                 | 4/27/2011                 | 14:30       |                                                                                     |
| W-2         | 20.50                    | 15.16                                   | -                          | -                      | 11:20                      | 13.33      | 4.71      | 56.80    | 5.81 | 0.44                 | 11:25                       | 1.00                                    | 2.50                | 12.98      | 1.88      | 30.60    | 6.17 | 0.46                 | 4/26/2011                 | 11:25       |                                                                                     |
| W-5         | 13.00                    | 3.11                                    | -                          | -                      | 11:40                      | 11.32      | 4.97      | -96.70   | 6.86 | 0.62                 | 11:50                       | 2.00                                    | 19.00               | 11.07      | 1.20      | -78.20   | 6.55 | 0.63                 | 4/26/2011                 | 11:50       |                                                                                     |
| W-6         | 10.00                    | 2.52                                    | -                          | -                      | 12:30                      | 11.17      | 6.44      | 82.80    | 5.73 | 0.38                 | 12:45                       | 1.00                                    | 4.00                | 10.47      | 1.45      | 87.40    | 5.13 | 0.35                 | 4/26/2011                 | 12:45       |                                                                                     |
| * W-8       | 13.00                    | -                                       | _ <sup>3</sup>             | -                      | -                          | -          | -         | -        | -    | -                    | -                           | -                                       | -                   | -          | -         | -        | -    | -                    | 4/27/2011                 | 14:06       | Product sample collected 4/27/11 @ 1406. Product too thick to collect gauging data. |
| W-9         | 63.00                    | 9.39                                    | -                          | -                      | 10:25                      | 12.46      | 2.16      | -28.90   | 6.61 | 0.51                 | 10:40                       | 2.00                                    | 26.00               | 13.83      | 23.47     | -19.40   | 6.70 | 0.52                 | 4/26/2011                 | 10:40       |                                                                                     |
| W-10        | -                        | -                                       | -                          | -                      | -                          | -          | -         | -        | -    | -                    | -                           | 0.00                                    | 0.00                | -          | -         | -        | -    | -                    | -                         | -           | Well location damaged.                                                              |
| W-11        | 5.70                     | 3.69                                    | -                          | -                      | 13:00                      | 13.02      | 2.50      | 90.60    | 5.36 | 0.32                 | 13:20                       | 1.00                                    | 1.00                | 11.42      | 1.71      | 39.80    | 6.06 | 0.30                 | 4/26/2011                 | 13:20       |                                                                                     |
| W-12        | 13.00                    | 2.97                                    | -                          | -                      | 13:40                      | 11.17      | 6.87      | 76.60    | 5.60 | 0.28                 | 13:55                       | 2.50                                    | 19.00               | 11.64      | 2.63      | 63.20    | 5.67 | 0.35                 | 4/26/2011                 | 13:55       |                                                                                     |
| W-13        | 74.00                    | 7.57                                    | -                          | -                      | 14:00                      | 13.55      | 1.29      | -3.40    | 7.01 | 0.28                 | 14:15                       | 2.50                                    | 32.00               | 14.06      | 1.05      | 4.20     | 6.19 | 0.63                 | 4/26/2011                 | 14:15       |                                                                                     |
| *W-14       | 10.00                    | 2.12                                    | 2.01                       | 0.11                   | -                          | -          | -         | -        | -    | -                    | -                           | -                                       | -                   | -          | -         | -        | -    | -                    | 4/27/2011                 | 14:00       | Product sample collected 4/27/11 @ 1400. Product gauging data was collected.        |
| W-15        | 10.00                    | 2.15                                    | -                          | -                      | 12:20                      | 9.17       | 10.15     | -20.90   | 7.32 | 1.04                 | 12:25                       | 2.00                                    | 4.00                | 9.77       | 6.43      | -32.80   | 7.59 | 0.93                 | 4/26/2011                 | 12:25       |                                                                                     |
| W-16        | 12.00                    | 2.42                                    | -                          | -                      | -                          | 11.71      | 0.78      | -247.70  | 7.39 | 0.76                 | 12:20                       | Hand bailed                             | -                   | 10.68      | 1.05      | -271.60  | 7.24 | 0.28                 | 4/27/2011                 | 12:20       |                                                                                     |
| W-17        | 10.00                    | 2.89                                    | -                          | -                      | -                          | 10.14      | 2.46      | -171.30  | 7.33 | 0.82                 | 12:10                       | Hand bailed                             | -                   | 12.04      | 0.90      | -256.90  | 7.05 | 0.89                 | 4/27/2011                 | 12:10       |                                                                                     |
| *W-18       | 15.00                    | -                                       | _ <sup>3</sup>             | -                      | -                          | -          | -         | -        | -    | -                    | -                           | -                                       | -                   | -          | -         | -        | -    | -                    | 4/27/2011                 | 13:30       | Product sample collected 4/27/11 @ 1330. Product too thick to collect gauging data. |
| W-19        | 83.00                    | 10.87                                   | -                          | -                      | 9:15                       | 12.55      | 2.41      | 108.00   | 7.77 | 0.66                 | 9:35                        | 2.00                                    | 35.00               | 13.01      | 4.63      | -68.90   | 7.30 | 0.74                 | 4/27/11                   | 9:35        |                                                                                     |
| W-20        | 12.00                    | 4.75                                    | -                          | -                      | 9:00                       | 11.01      | 3.13      | 57.80    | 7.44 | 1.06                 | 9:10                        | 2.00                                    | 14.00               | 11.58      | 11.30     | 154.80   | 6.82 | 0.03                 | 4/27/2011                 | 9:10        |                                                                                     |
| W-22        | 8.00                     | 0.99                                    | -                          | -                      | 10:35                      | 11.40      | 3.40      | -41.90   | 7.09 | 0.69                 | 10:40                       | Hand bailed                             | 3.00                | -          | -         | -        | -    | -                    | 4/27/2011                 | 10:40       |                                                                                     |
| W-23        | 10.00                    | 2.10                                    | -                          | -                      | 10:45                      | 12.53      | 1.15      | -99.30   | 6.85 | 1.73                 | 10:50                       | Hand bailed                             | 4.00                | -          | -         | -        | -    | -                    | 4/27/2011                 | 10:50       |                                                                                     |
| W-24        | 15.00                    | -                                       | -                          | -                      | -                          | -          | -         | -        | -    | -                    | -                           | -                                       | -                   | -          | -         | -        | -    | -                    | -                         | -           | Well location under water unable to collect water samples.                          |
| W-25        | 17.00                    | 5.71                                    | -                          | -                      | 13:55                      | 11.64      | 6.01      | -41.40   | 6.96 | 1.24                 | 13:55                       | 2.00                                    | 22.00               | 11.28      | 2.84      | -137.60  | 7.18 | 0.89                 | 4/26/2011                 | 13:55       |                                                                                     |
| W-26        | 37.00                    | 11.68                                   | -                          | -                      | 14:00                      | 14.43      | 2.51      | -94.10   | 6.46 | 0.53                 | 14:10                       | 2.00                                    | 12.00               | 14.49      | 2.56      | -134.30  | 6.54 | 0.53                 | 4/26/2011                 | 14:10       |                                                                                     |
| W-27        | 20.00                    | 6.18                                    | -                          | -                      | 14:10                      | 11.34      | 2.88      | 22.50    | 7.04 | 0.62                 | 13:10                       | 2.00                                    | 7.00                | 11.33      | 6.98      | 20.50    | 7.15 | 0.59                 | 4/26/2011                 | 13:10       |                                                                                     |
| W-1D        | 76.50                    | 9.19                                    | -                          | -                      | 9:50                       | 15.72      | 6.37      | 40.10    | 7.03 | 0.50                 | 10:45                       | 2.50                                    | 128.00              | 15.40      | 1.22      | 6.30     | 5.87 | 0.56                 | 4/26/2011                 | 10:45       |                                                                                     |
| W-28        | 14.00                    | 3.22                                    | -                          | -                      | 11:55                      | 11.89      | 5.41      | 44.70    | 6.21 | 0.43                 | 12:10                       | 2.50                                    | 20.00               | 12.25      | 12.04     | 127.00   | 6.51 | 0.03                 | 4/26/2011                 | 12:10       |                                                                                     |
| W-29        | 14.00                    | 7.36                                    | -                          | -                      | 10:55                      | 11.78      | 9.22      | 13.40    | 6.58 | 0.44                 | 11:05                       | 2.50                                    | 13.00               | 11.45      | 2.02      | 40.70    | 5.87 | 0.44                 | 4/26/2011                 | 11:05       |                                                                                     |
| W-30        | 13.00                    | 3.40                                    | -                          | -                      | 11:15                      | 10.20      | 17.55     | -57.00   | 7.82 | 1.31                 | 11:25                       | 2.00                                    | 19.00               | 9.88       | 2.13      | -123.70  | 7.60 | 1.29                 | 4/26/2011                 | 11:25       |                                                                                     |
| W-31        | 15.00                    | 3.13                                    | -                          | -                      | 15:00                      | 11.73      | 3.96      | 72.60    | 5.71 | 0.45                 | 15:15                       | 2.50                                    | 23.00               | 10.72      | 2.86      | 54.10    | 5.59 | 0.46                 | 4/26/2011                 | 15:15       |                                                                                     |
| W-32        | 13.00                    | 9.09                                    | -                          | -                      | -                          | 11.26      | 2.27      | -182.50  | 7.34 | 1.97                 | 13:00                       | -                                       | -                   | -          | -         | -        | -    | -                    | 4/27/2011                 | 13:00       |                                                                                     |
| W-32D       | 53.00                    | 11.43                                   | -                          | -                      | -                          | 13.34      | 0.70      | -173.50  | 6.78 | 0.71                 | 13:20                       | -                                       | -                   | -          | -         | -        | -    | -                    | 4/27/2011                 | 13:20       |                                                                                     |
| W-33        | 16.00                    | 11.35                                   | -                          | -                      | 10:55                      | 10.74      | 2.06      | -51.60   | 7.01 | 2.83                 | 11:00                       | Hand bailed                             | 9.00                | -          | -         | -        | -    | -                    | 4/27/2011                 | 11:00       |                                                                                     |
| W-34        | 14.00                    | 8.27                                    | -                          | -                      | 10:10                      | 10.15      | 8.80      | 52.40    | 6.71 | 0.45                 | 10:20                       | 2.50                                    | 11.00               | 9.92       | 2.64      | 78.30    | 5.74 | 0.46                 | 4/27/2011                 | 10:20       |                                                                                     |

**Notes:**  
(1) - Measured prior to purging  
(2) - Wells purged with whale pump unless otherwise noted  
(3) - LNAPL thickness values obtained from June 2010 gauging event. Product in well was too viscous to collect accurate product thickness in April 2011.  
Groundwater quality readings collected using a YSI meter  
A minimum of 3 well volumes were purged at each well location, unless well went dry during purging  
All wells were sampled using poly bailers  
Hand - Well purged using bailer  
\* - LNAPL Sample Collected  
ft btic - Feet below top of inner casing  
ft bgs - Feet below ground surface  
mg/L - Milligrams per Liter  
°C - Degrees Celsius  
mV - Millivolts  
mS/cm - Millisiemens per centimeter  
NM - Not measured  
gpm - Gallons per minute  
NM - Total depth of well not measured due to the presence of light non aqueous phase liquid (LNAPL)  
(-) - No Data Available



## **APPENDIX F**

### LNAPL Characterization Data



# Torkelson Geochemistry, Inc.

2528 S. Columbia Place  
Tulsa, OK 74114-3233

Phone: 918-749-8441  
Fax: 918-749-8005

e-mail: BTorkelson@torkelsongeochemistry.com

## CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project: Philadelphia Refinery - AOI-10  
Location: Philadelphia, Pa  
Proj. No.:  
P.O.:  
Sampled By: Shaun Sykes

Report/Bill To: Aquaterra Technologies, Inc.  
Address: PO Box 744  
West Chester, Pa 19381  
Phone: 610-431-5733 x.109  
Fax: 610-431-5734  
e-mail: td@aquaterra-tech.com

### Additional Instructions

Please include a brief interpretation of product type consistent with other samples from the refinery

Requested Turn-Around Time: normal

| ITEM NO. | SAMPLE DESCRIPTION | DATE    | MATRIX | LAB NO. | Total # Of Vials | PRESERVATIVES |  |  |  | ANALYSES REQUESTED  |         |           |                       |                      |                            |      |        |  |  | REMARKS |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------|--------------------|---------|--------|---------|------------------|---------------|--|--|--|---------------------|---------|-----------|-----------------------|----------------------|----------------------------|------|--------|--|--|---------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|          |                    |         |        |         |                  | None          |  |  |  | GC Characterization | Density | Viscosity | Water Surface Tension | NAPL Surface Tension | NAPL/Water Interfac. Tens. | Lead | Sulfur |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1        | W-8                | 4/27/11 |        |         | 1                |               |  |  |  |                     |         | X         | X                     |                      |                            |      |        |  |  |         | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2        | W-14               | 4/27/11 |        |         | 1                |               |  |  |  |                     |         | X         | X                     |                      |                            |      |        |  |  |         | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3        | W-18               | 4/27/11 |        |         | 1                |               |  |  |  |                     |         | X         | X                     |                      |                            |      |        |  |  |         | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9        |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10       |                    |         |        |         |                  |               |  |  |  |                     |         |           |                       |                      |                            |      |        |  |  |         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

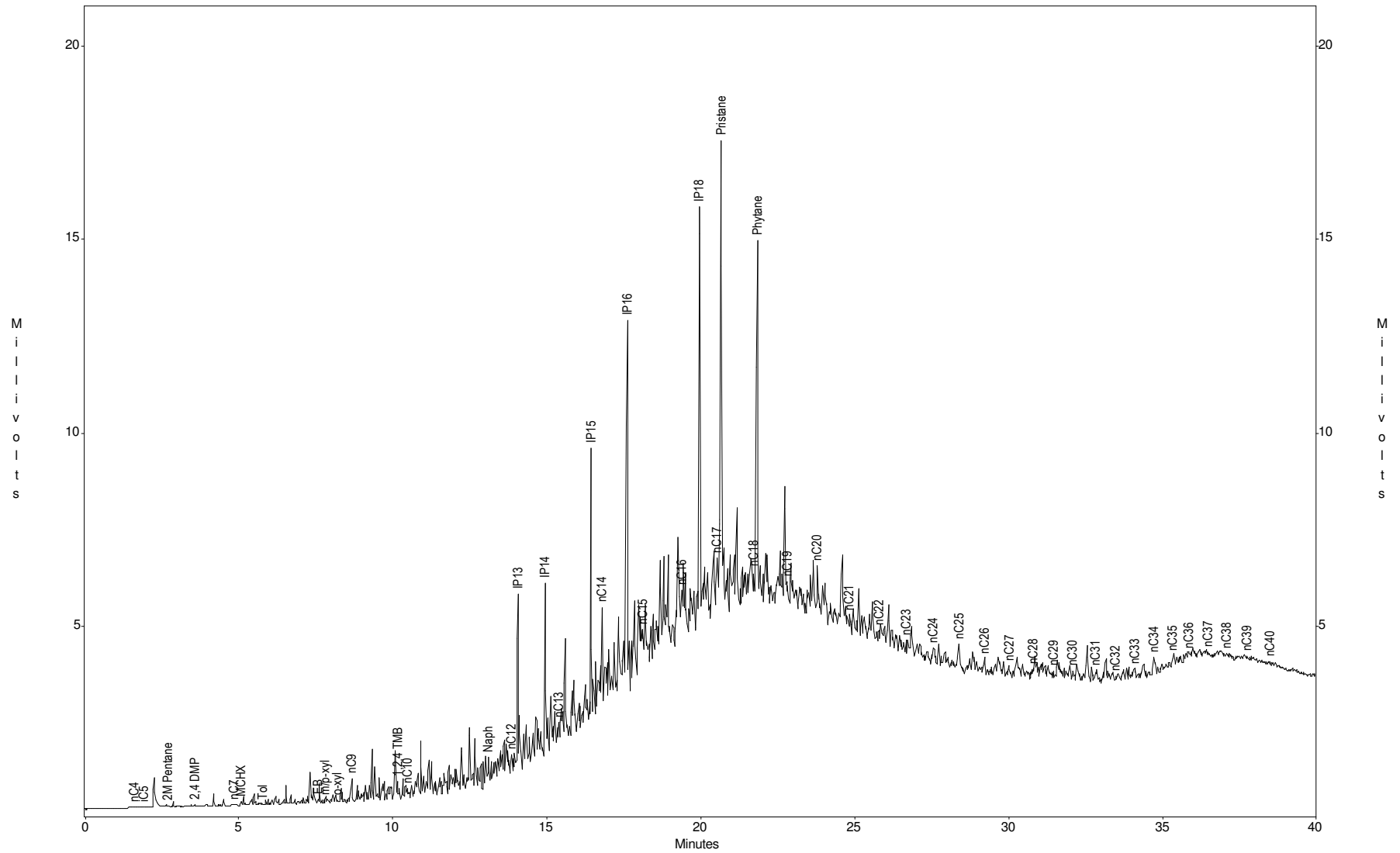
| RELINQUISHED BY    | ACCEPTED BY               | DATE    | TIME |
|--------------------|---------------------------|---------|------|
| <i>[Signature]</i> | <i>[Signature]</i> Fed Ex | 5/5/11  | 1200 |
|                    | <i>[Signature]</i>        | 5-10-11 | 0910 |

Philadelphia Refinery - AOI-10, Philadelphia, PA

Sample ID : W-8

Acquired : May 11, 2011 09:37:00

c:\ezchrom\chrom\11076\w-8 -- Channel A



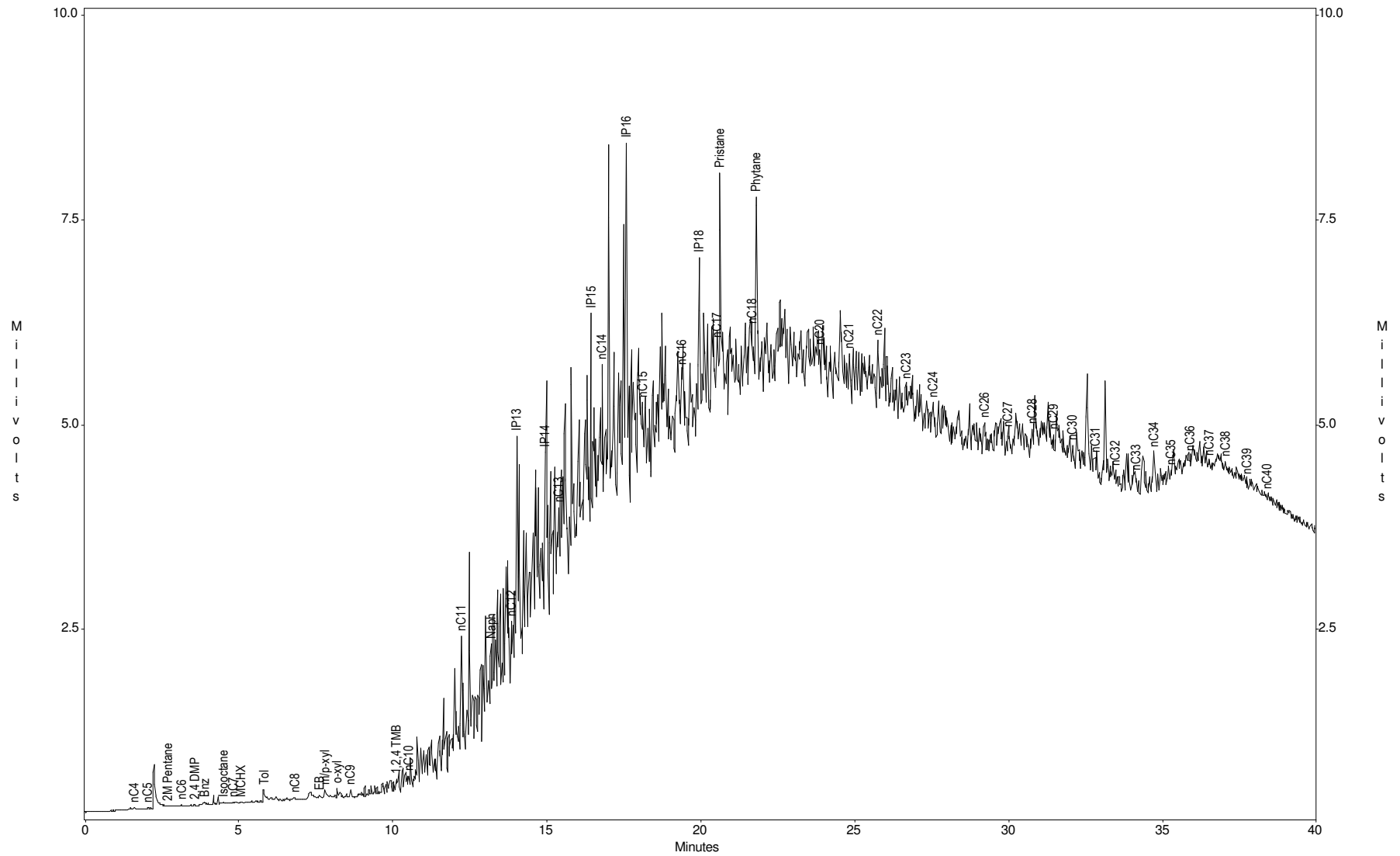
# Torkelson Geochemistry, Inc.

Philadelphia Refinery - AOI-10, Philadelphia, PA

Sample ID : W-14

Acquired : May 11, 2011 12:10:20

c:\ezchrom\chrom\11076w-14 -- Channel A



# Torkelson Geochemistry, Inc.

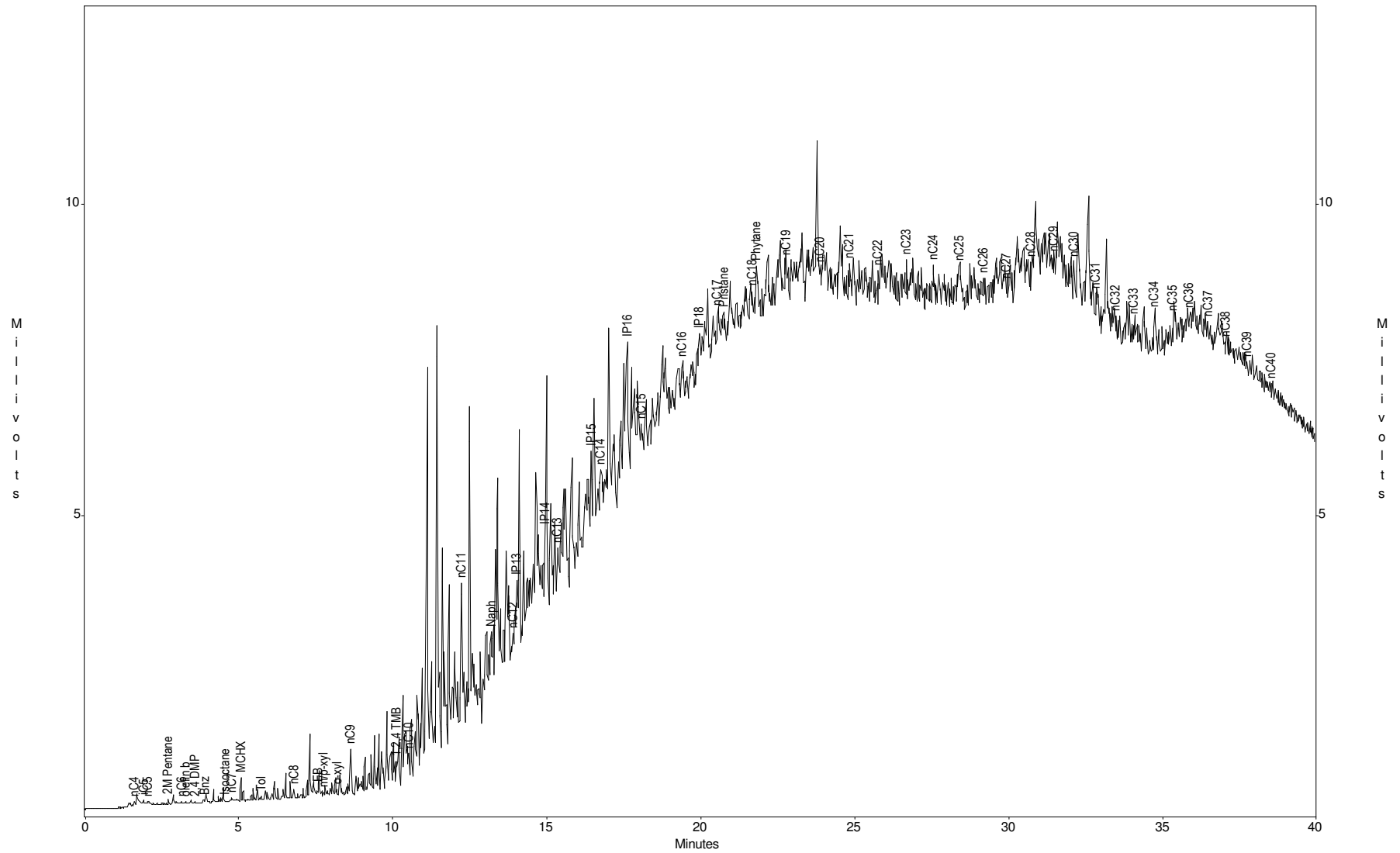
Page 1 of 1 (3)

Philadelphia Refinery - AOI-10, Philadelphia, PA

Sample ID : W-18

Acquired : May 11, 2011 14:41:20

c:\ezchrom\chrom\11076\w-18 -- Channel A



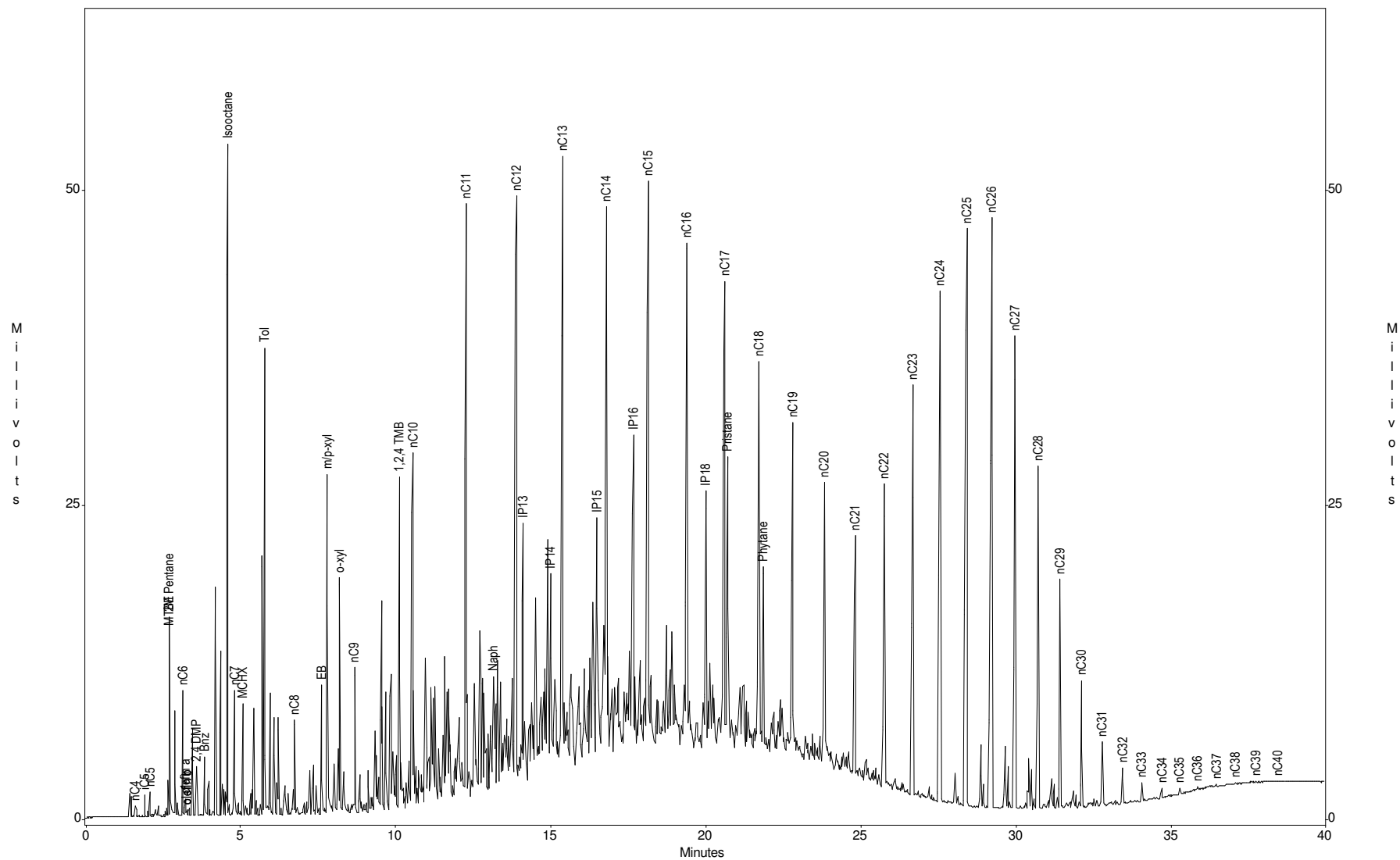


Philadelphia Refinery - AOI-10, Philadelphia, PA

Sample ID : Gas/Dies/Wax std

Acquired : May 11, 2011 08:45:38

c:\ezchrom\chrom\11076\gadiwax2 -- Channel A



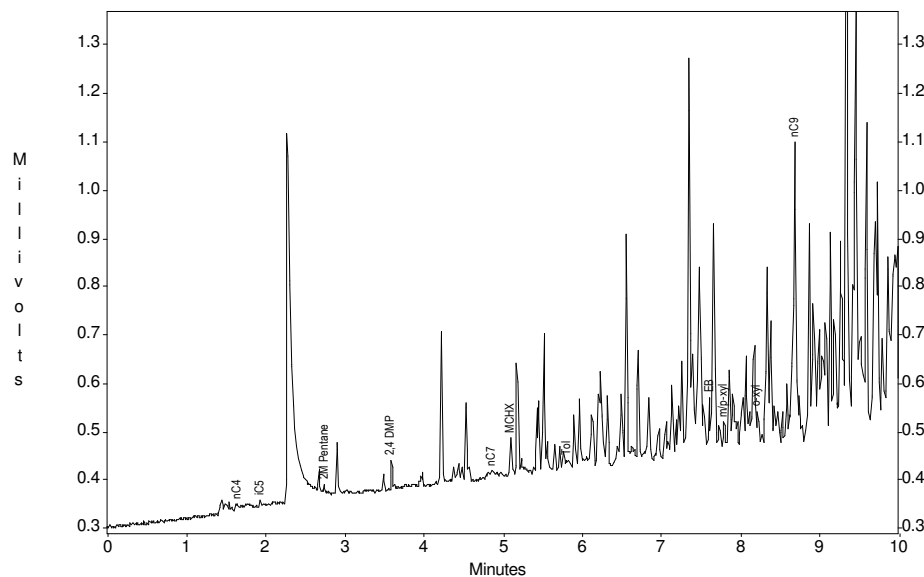
# Torkelson Geochemistry, Inc.

Philadelphia Refinery - AOI-10, Philadelphia, PA

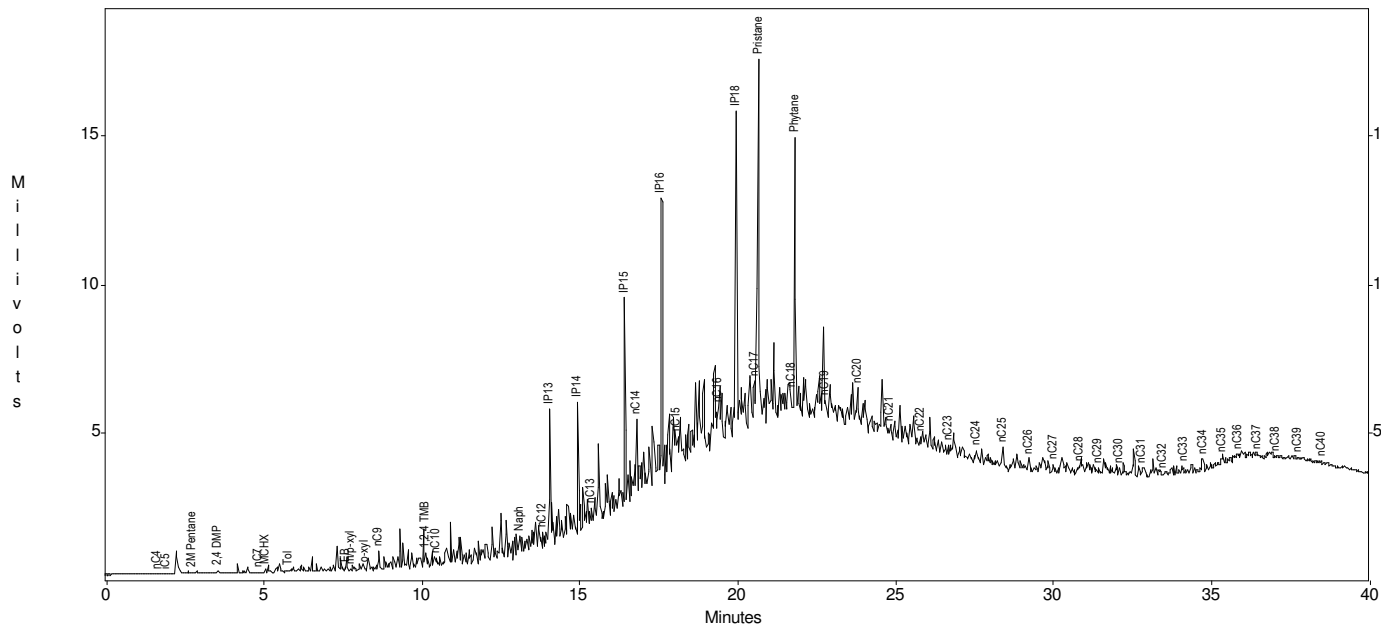
Sample ID : W-8

Acquired : May 11, 2011 09:37:00

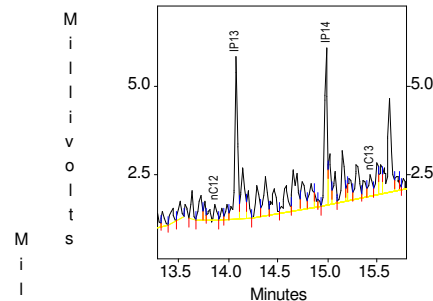
c:\ezchrom\chrom\11076w-8 -- Channel A



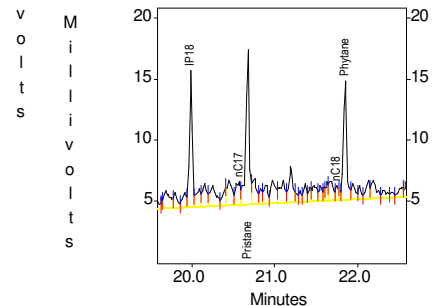
c:\ezchrom\chrom\11076w-8 -- Channel A



c:\ezchrom\chrom\11076w-8 -- Channel A



c:\ezchrom\chrom\11076w-8 -- Channel A



Channel A Results

Page 1 of 1 (1)

| Peak       | Area  | Height |
|------------|-------|--------|
| nC4        | 26    | 9      |
| iC5        | 13    | 14     |
| nC5        | 0     | 0      |
| MTBE       | 0     | 0      |
| 2M Pentane | 26    | 18     |
| nC6        | 0     | 0      |
| olefin a   | 0     | 0      |
| olefin b   | 0     | 0      |
| olefin c   | 0     | 0      |
| 2,4 DMP    | 71    | 61     |
| Bnz        | 0     | 0      |
| Isooctane  | 0     | 0      |
| nC7        | 12    | 6      |
| MCHX       | 137   | 80     |
| Tol        | 60    | 18     |
| nC8        | 0     | 0      |
| EB         | 184   | 116    |
| m/p-xyl    | 122   | 61     |
| o-xyl      | 192   | 73     |
| nC9        | 1278  | 623    |
| 1,2,4 TMB  | 1428  | 463    |
| nC10       | 625   | 271    |
| nC11       | 0     | 0      |
| Naph       | 1924  | 690    |
| nC12       | 1373  | 426    |
| IP13       | 8332  | 4543   |
| IP14       | 6898  | 4436   |
| nC13       | 1666  | 583    |
| IP15       | 10866 | 6887   |
| nC14       | 5080  | 2616   |
| IP16       | 21224 | 9646   |
| nC15       | 1338  | 380    |
| nC16       | 2931  | 1460   |
| IP18       | 27062 | 11195  |
| nC17       | 8600  | 1948   |
| Pristane   | 35844 | 12690  |
| nC18       | 2310  | 1203   |
| Phytane    | 26486 | 9732   |
| nC19       | 1722  | 579    |
| nC20       | 4027  | 1396   |
| nC21       | 1280  | 471    |
| nC22       | 1111  | 362    |
| nC23       | 792   | 339    |
| nC24       | 2373  | 429    |
| nC25       | 4148  | 691    |
| nC26       | 1682  | 434    |
| nC27       | 838   | 287    |
| nC28       | 1048  | 250    |
| nC29       | 333   | 189    |
| nC30       | 298   | 154    |
| nC31       | 131   | 91     |
| nC32       | 86    | 78     |
| nC33       | 241   | 133    |
| nC34       | 667   | 194    |
| nC35       | 121   | 34     |
| nC36       | 62    | 20     |
| nC37       | 99    | 75     |
| nC38       | 164   | 45     |
| nC39       | 39    | 62     |
| nC40       | 92    | 57     |

# Torkelson Geochemistry, Inc.

Philadelphia Refinery - AOI-10, Philadelphia, PA

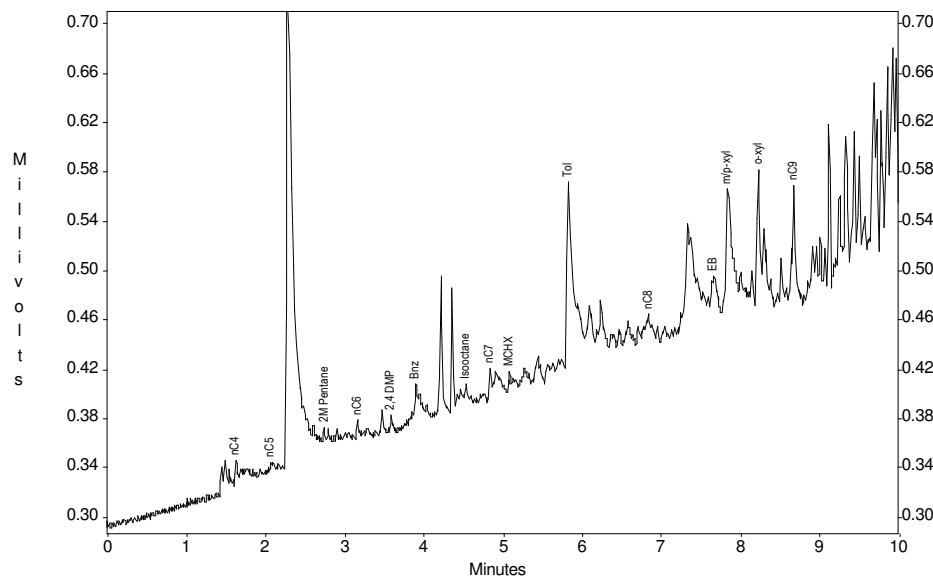
Sample ID : W-14

Acquired : May 11, 2011 12:10:20

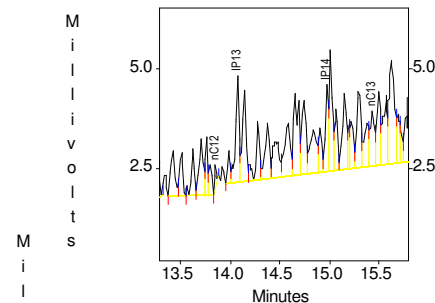
Page 1 of 1 (1)

Channel A Results

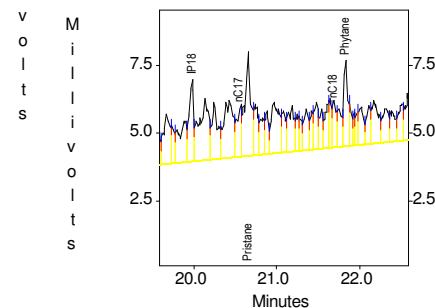
c:\ezchrom\chrom\11076w-14 -- Channel A



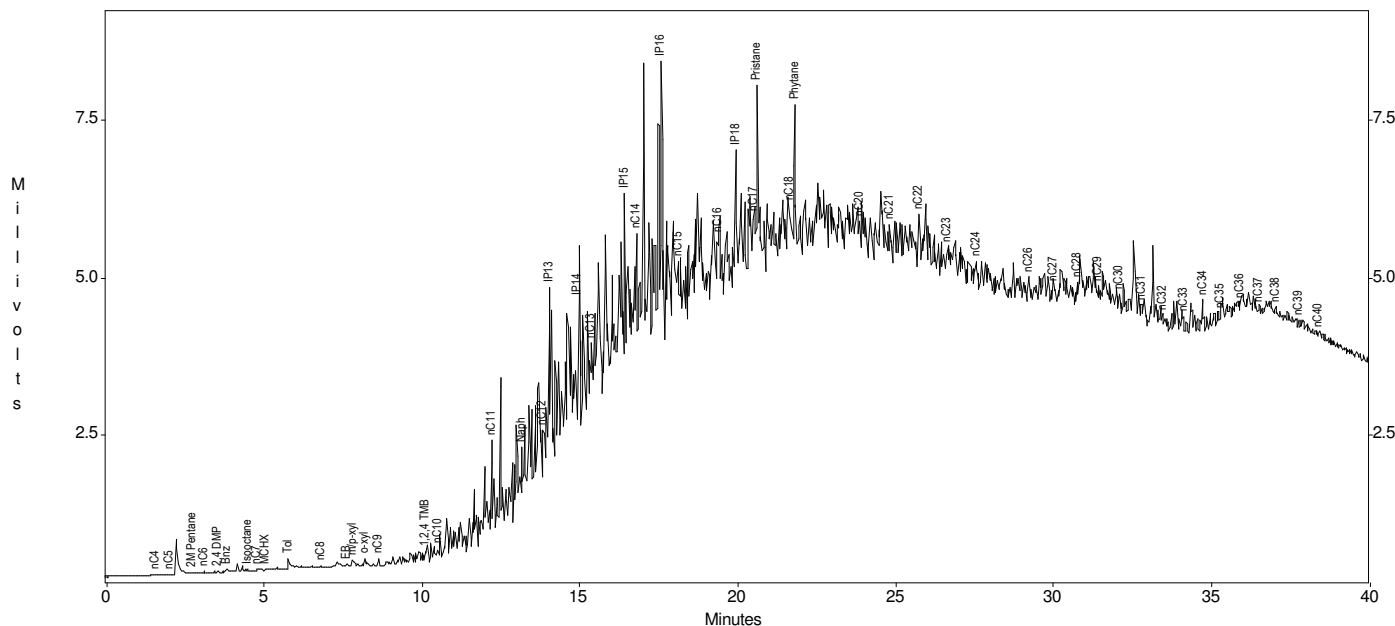
c:\ezchrom\chrom\11076w-14 -- Channel A



c:\ezchrom\chrom\11076w-14 -- Channel A



c:\ezchrom\chrom\11076w-14 -- Channel A



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| Peak       | Area  | Height |
|------------|-------|--------|
| nC4        | 30    | 18     |
| iC5        | 0     | 0      |
| nC5        | 16    | 6      |
| MTBE       | 0     | 0      |
| 2M Pentane | 15    | 11     |
| nC6        | 26    | 13     |
| olefin a   | 0     | 0      |
| olefin b   | 0     | 0      |
| olefin c   | 0     | 0      |
| 2,4 DMP    | 19    | 13     |
| Bnz        | 60    | 24     |
| Isodane    | 31    | 15     |
| nC7        | 37    | 22     |
| MCHX       | 18    | 12     |
| Tol        | 696   | 150    |
| nC8        | 122   | 26     |
| EB         | 219   | 41     |
| m/p-xyl    | 666   | 108    |
| o-xyl      | 310   | 117    |
| nC9        | 235   | 99     |
| 1,2,4 TMB  | 365   | 168    |
| nC10       | 255   | 161    |
| nC11       | 2662  | 1386   |
| Naph       | 1804  | 664    |
| nC12       | 596   | 515    |
| IP13       | 6689  | 2668   |
| IP14       | 4029  | 2196   |
| nC13       | 3982  | 1383   |
| IP15       | 7913  | 3433   |
| nC14       | 6859  | 2697   |
| IP16       | 18715 | 5161   |
| nC15       | 6080  | 1832   |
| nC16       | 7165  | 1833   |
| IP18       | 11154 | 3036   |
| nC17       | 8304  | 1828   |
| Pristane   | 17353 | 3866   |
| nC18       | 5348  | 1639   |
| Phytane    | 10753 | 3207   |
| nC19       | 0     | 0      |
| nC20       | 2476  | 721    |
| nC21       | 966   | 475    |
| nC22       | 2746  | 912    |
| nC23       | 1084  | 511    |
| nC24       | 1885  | 428    |
| nC25       | 0     | 0      |
| nC26       | 1608  | 389    |
| nC27       | 1420  | 262    |
| nC28       | 1183  | 308    |
| nC29       | 314   | 191    |
| nC30       | 559   | 212    |
| nC31       | 127   | 126    |
| nC32       | 218   | 130    |
| nC33       | 102   | 129    |
| nC34       | 483   | 202    |
| nC35       | 82    | 75     |
| nC36       | 144   | 84     |
| nC37       | 52    | 26     |
| nC38       | 143   | 88     |
| nC39       | 123   | 97     |
| nC40       | 270   | 63     |

# Torkelson Geochemistry, Inc.

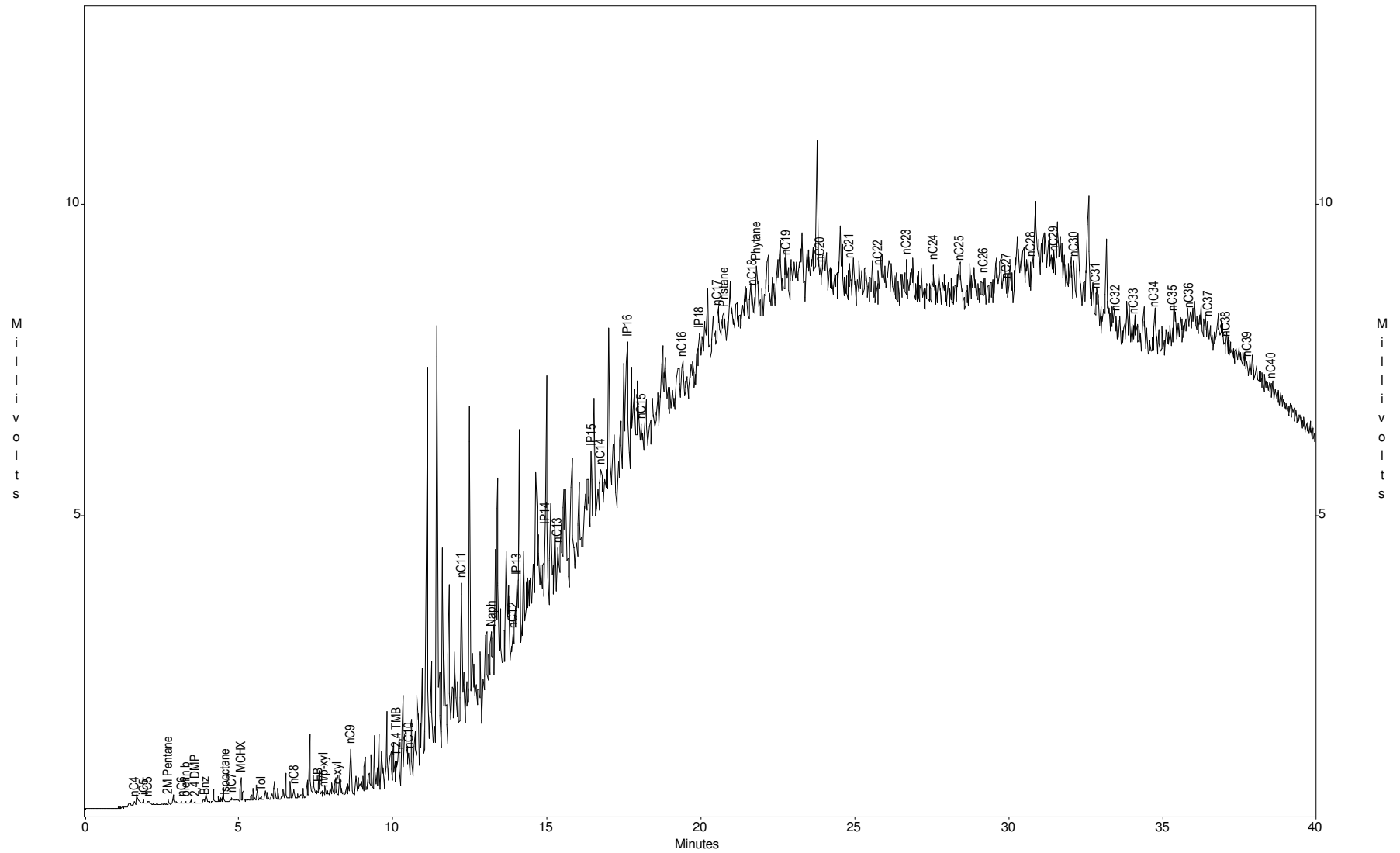
Page 1 of 1 (3)

Philadelphia Refinery - AOI-10, Philadelphia, PA

Sample ID : W-18

Acquired : May 11, 2011 14:41:20

c:\ezchrom\chrom\11076w-18 -- Channel A



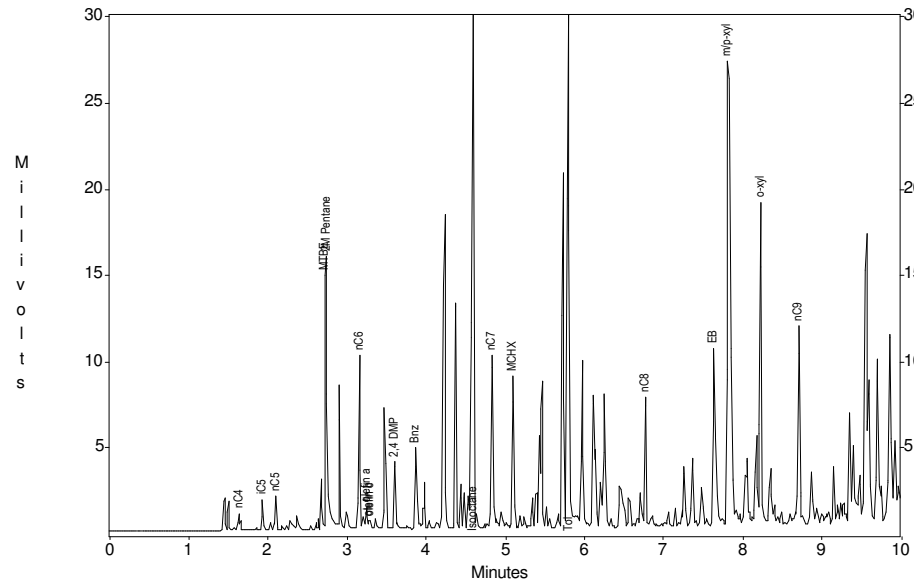
# Torkelson Geochemistry, Inc.

Philadelphia Refinery - AOI-10, Philadelphia, PA

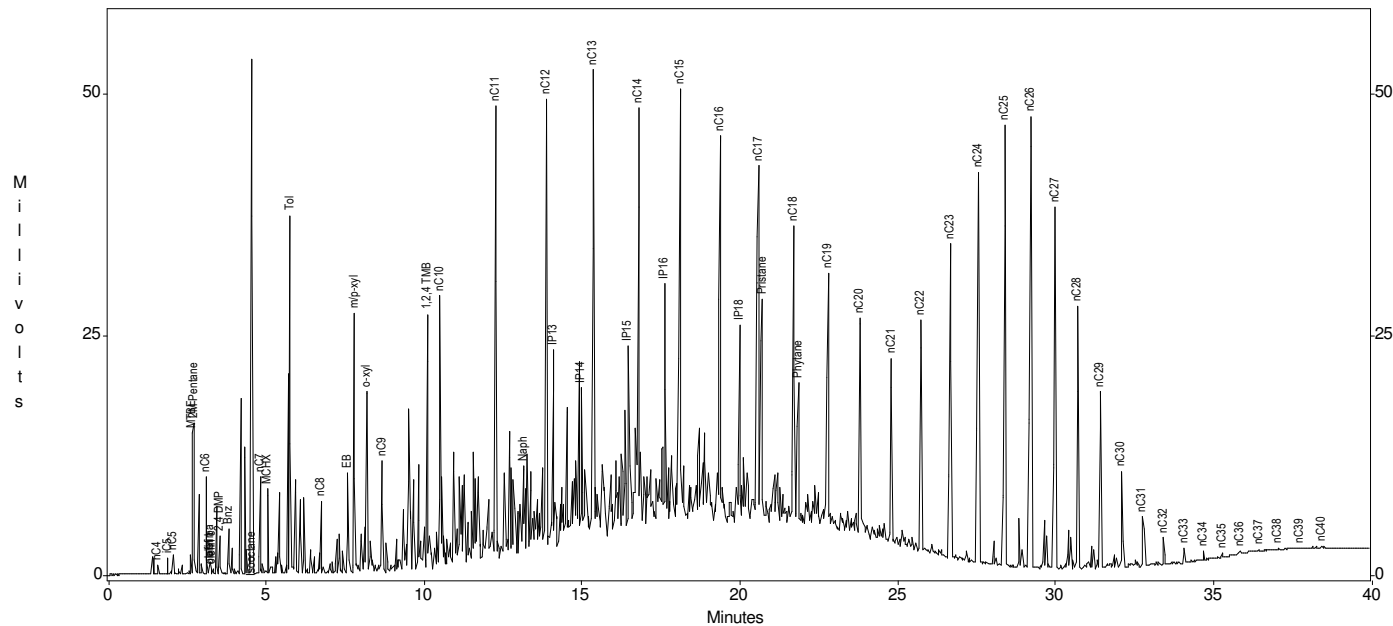
Sample ID : Gas/Dies/Wax std

Acquired : May 11, 2011 08:45:38

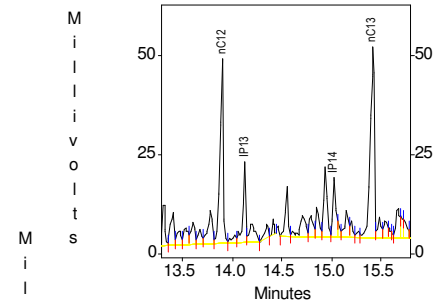
c:\ezchrom\chrom\11076\gadiwax2 -- Channel A



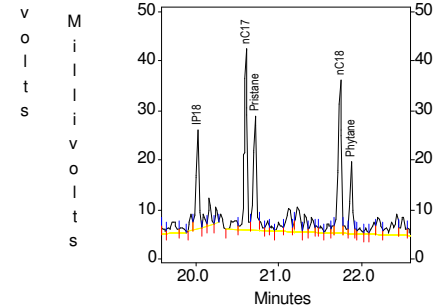
c:\ezchrom\chrom\11076\gadiwax2 -- Channel A



c:\ezchrom\chrom\11076\gadiwax2 -- Channel A



c:\ezchrom\chrom\11076\gadiwax2 -- Channel A



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| Peak       | Area   | Height |
|------------|--------|--------|
| nC4        | 882    | 909    |
| iC5        | 1633   | 1749   |
| nC5        | 1940   | 1953   |
| MTBE       | 8850   | 14569  |
| 2M Pentane | 18459  | 15652  |
| nC6        | 10279  | 9981   |
| olefin a   | 1514   | 1289   |
| olefin b   | 601    | 484    |
| olefin c   | 615    | 477    |
| 2,4 DMP    | 4152   | 3895   |
| Bnz        | 6800   | 4664   |
| Isooctane  | 72556  | 53339  |
| nC7        | 13271  | 9974   |
| MCHX       | 11206  | 8826   |
| Tol        | 57982  | 37077  |
| nC8        | 9634   | 7484   |
| EB         | 18905  | 10280  |
| m/p-xyl    | 61342  | 26945  |
| o-xyl      | 29293  | 18689  |
| nC9        | 18569  | 11567  |
| 1,2,4 TMB  | 51680  | 26364  |
| nC10       | 47623  | 28216  |
| nC11       | 122201 | 47154  |
| Naph       | 23589  | 9025   |
| nC12       | 106065 | 46620  |
| IP13       | 44181  | 20448  |
| IP14       | 27510  | 14987  |
| nC13       | 136271 | 48220  |
| IP15       | 40217  | 19413  |
| nC14       | 127674 | 44012  |
| IP16       | 58532  | 25574  |
| nC15       | 127948 | 45568  |
| nC16       | 109771 | 40258  |
| IP18       | 46900  | 19832  |
| nC17       | 97658  | 36773  |
| Pristane   | 58335  | 22987  |
| nC18       | 78896  | 31071  |
| Phytane    | 35304  | 14857  |
| nC19       | 79141  | 26845  |
| nC20       | 54013  | 22611  |
| nC21       | 41857  | 19064  |
| nC22       | 54172  | 24047  |
| nC23       | 86519  | 32680  |
| nC24       | 132481 | 40589  |
| nC25       | 156315 | 45816  |
| nC26       | 157441 | 46917  |
| nC27       | 118660 | 37602  |
| nC28       | 74059  | 27225  |
| nC29       | 40797  | 18246  |
| nC30       | 19773  | 9898   |
| nC31       | 9574   | 4849   |
| nC32       | 5379   | 2820   |
| nC33       | 2901   | 1511   |
| nC34       | 1690   | 857    |
| nC35       | 1012   | 480    |
| nC36       | 527    | 254    |
| nC37       | 561    | 177    |
| nC38       | 191    | 86     |
| nC39       | 196    | 88     |
| nC40       | 101    | 49     |



Torkelson Geochemistry, Inc.

Physical Properties Measurements

| Sample | TGI Job Number | Density of NAPL (gm/ml) | Viscosity of NAPL (centipoise) | Surface Tension Air/Water (dynes/cm) | Interfacial Tension NAPL/Water (dynes/cm) | Surface Tension Air/NAPL (dynes/cm) | Temperature of Measurements |
|--------|----------------|-------------------------|--------------------------------|--------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------|
| W-8    | 11047          | 0.9515                  | NA                             | NA                                   | NA                                        | NA                                  | 60F                         |
| W-14   | 11047          | 0.9478                  | NA                             | NA                                   | NA                                        | NA                                  | 60F                         |
| W-18   | 11047          | QNS                     | NA                             | NA                                   | NA                                        | NA                                  | 60F                         |

QNS = Quantity of sample Not Sufficient for analysis

NA = Not Analyzed

6825 East 38th Street  
Tulsa, Oklahoma 74145-1105  
www.greencountrytesting.com



Telephone 918.828.9977  
Telephone 800.324.5757  
Facsimile 918.828.7750

Bruce Torkelson  
Torkelson Geochemistry  
2528 South Columbia Place  
Tulsa, OK 74114  
TEL: (918) 749-8441  
FAX (918) 749-6005

May 27, 2011  
Order No.: T11050348

RE: Samples

Dear Bruce Torkelson:

Green Country Testing, Inc. received 2 samples on 5/20/2011 for the analyses presented in the following report.

In accordance with your instructions, Green Country Testing conducted the analysis shown on the following pages on samples submitted by your company. The results related only to the items tested. Unless otherwise noted, all analysis was conducted using EPA approved methodologies. Test reports meet all the NELAC requirements. All relevant sampling information is on the attached chain-of-custody form. The initials SUB as the analyst designate any testing sub-contracted by Green Country Testing.

Certifications/Accreditation: OK - 7604

AR - ADEQ  
KS - E-10232  
LA - 4002

A scope of Certified/Accredited parameters is available upon request. If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Approved By: \_\_\_\_\_

  
Brian Duzan, Director  
Environmental Services



**CLIENT:** Torkelson Geochemistry  
**Lab Order:** T11050348  
**Project:** Samples

**Date Received:** 5/20/2011  
**Date Reported:** 27-May-11

**Lab ID:** T11050348-01    **Collection Date:** 4/27/2011    **Sample ID:** W-8 11076  
**Matrix:** OIL

| <u>Analyses</u>                        | <u>Result</u>  | <u>Detection Limit</u> | <u>Qual</u> | <u>Units</u> | <u>Date Analyzed</u> | <u>Analyst</u> |
|----------------------------------------|----------------|------------------------|-------------|--------------|----------------------|----------------|
| <b>METALS IN SOIL OR SLUDGE BY ICP</b> | <b>SW6010B</b> |                        |             |              |                      | <b>KR</b>      |
| Lead                                   | < 0.500        | 0.500                  |             | mg/Kg        | 5/26/2011            |                |

**Lab ID:** T11050348-02    **Collection Date:** 4/27/2011    **Sample ID:** W-14 11076  
**Matrix:** OIL

| <u>Analyses</u>                        | <u>Result</u>  | <u>Detection Limit</u> | <u>Qual</u> | <u>Units</u> | <u>Date Analyzed</u> | <u>Analyst</u> |
|----------------------------------------|----------------|------------------------|-------------|--------------|----------------------|----------------|
| <b>METALS IN SOIL OR SLUDGE BY ICP</b> | <b>SW6010B</b> |                        |             |              |                      | <b>KR</b>      |
| Lead                                   | 1.89           | 0.500                  |             | mg/Kg        | 5/26/2011            |                |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds MCL or Permit Limitation

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
MI+ - Matrix Interference  
H - Exceeds Holding Time

6825 East 38th Street  
Tulsa, Oklahoma 74145-1105  
www.greencountrytesting.com



**Green Country**  
**T E S T I N G**

Telephone 918.828.9977  
Telephone 800.324.5757  
Facsimile 918.828.7750

**CLIENT:** Torkelson Geochemistry

**Work Order:** T11050348

**Project:** Samples

## QC SUMMARY REPORT

| TestCode  | Analyte | BatchID | QCType | Result | PQL   | Units | %Rec | %RPD  |
|-----------|---------|---------|--------|--------|-------|-------|------|-------|
| MET_S_ICP | Lead    | 5654    | MBLK   | < 0.12 | 0.125 | mg/Kg |      |       |
|           | Lead    | 5654    | LCS    | 48     | 0.125 | mg/Kg | 96.2 |       |
|           | Lead    | 5654    | LCS    | 47.36  | 0.125 | mg/Kg | 94.9 | 1.34  |
|           | Lead    | 5654    | MS     | 191.1  | 0.5   | mg/Kg | 97.1 |       |
|           | Lead    | 5654    | MSD    | 191.7  | 0.5   | mg/Kg | 97.4 | 0.303 |



### Country . Chain of Custody Record

Laboratory  
Number:

1050348

[illegible]

All samples submitted to Green Country Testing for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples.

Green Country Testing reserves the right to return unused sample protons.

## Green Country Testing

Green County Testing  
6825 East 38th Street • Tulsa, OK 74145

23 East 38th Street • Tulsa, OK / 41  
918-828-9977 • Fax (918) 828-7756

Part 1 - Laboratory Copy Part 2 - Report Copy Part 3 - Client's Temporary Copy





# Torkelson Geochemistry, Inc.

2528 S. Columbia Place  
Tulsa, OK 74114-3233

Phone: 918-749-8441 e-mail: BTorkelson@aol.com  
Fax: 918-749-6005

## CHAIN-OF-CUSTODY RECORD

Project: Sun- Philadelphia Refinery COA  
Location: Philadelphia, PA  
Proj. No.:  
P.O.:  
Sampled By: M. Brad Spence & Tim Deik

Report/Bill To: Colleen Costello  
Address: 30 South 17th St, Suite 1500  
Philadelphia, PA 19103  
Phone: 215.864.0640  
Fax: 215.864.0671  
e-mail:

### Additional Instructions

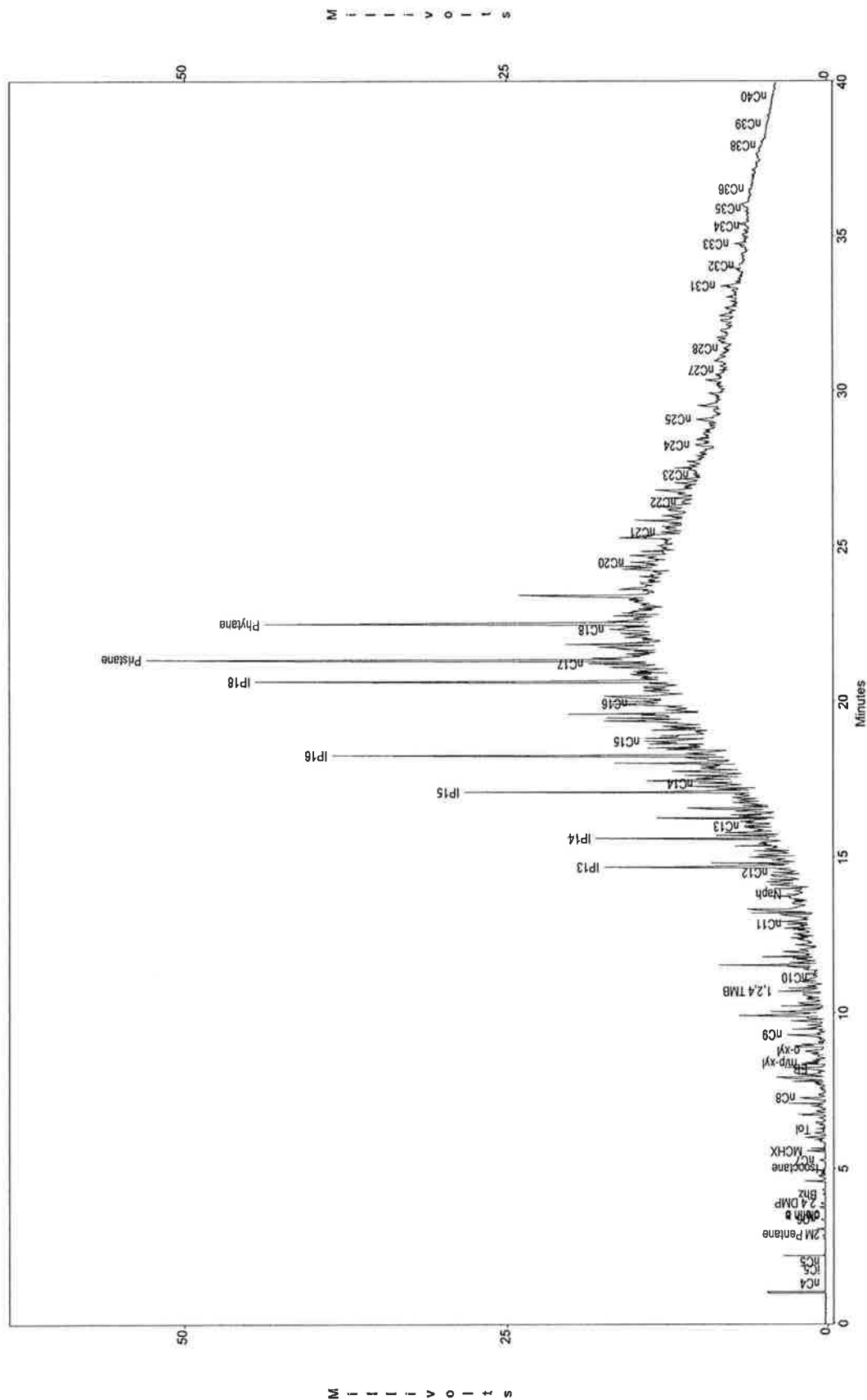
Requested Turn-Around Time:

| ITEM NO. | SAMPLE DESCRIPTION | DATE    | MATRIX  | LAB NO. | PRESERVATIVES    |      | ANALYSES REQUESTED  |                  |  |  |  |  |  |  |  |  | REMARKS            |
|----------|--------------------|---------|---------|---------|------------------|------|---------------------|------------------|--|--|--|--|--|--|--|--|--------------------|
|          |                    |         |         |         | Total # Of Vials | None | GC Characterization | Specific Gravity |  |  |  |  |  |  |  |  |                    |
| 1        | West Yard W8       | 2/27/04 | Product |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 2        | A-13               |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 3        | B-144              |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 4        | C-106              |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 5        | A-133              |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 6        | C-65               |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 7        | B-43               |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 8        | A-39               |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |
| 9        | A-136              |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  | Sorbent Pad Sample |
| 10       | C-107              |         |         |         | 1                | X    | X                   | X                |  |  |  |  |  |  |  |  |                    |

| RELINQUISHED BY | ACCEPTED BY   | DATE   | TIME |
|-----------------|---------------|--------|------|
| M. Brad Spence  | FED EX        | 3/1/04 |      |
|                 | Am. Petroleum | 3-2-04 | 1705 |

Sun - Philadelphia Refinery COA  
 Sample ID : West Yard W8  
 Acquired : Mar 07, 2004 08:54:39

c:\ezchrom\chrom\04046\wyw8 - Channel A



## **APPENDIX G**

### Fate and Transport Analysis

**APPENDIX G**  
**FATE AND TRANSPORT MODELING PROCEDURES**  
**AOI 10: SUNOCO PHILADELPHIA REFINERY**  
**PHILADELPHIA, PENNSYLVANIA**

**QUICK DOMENICO MODELING**

**G.1 INTRODUCTION**

Fate and transport calculations were completed for groundwater in Area of Interest (AOI) 10 to evaluate potential migration pathways/potential impacts to receptors. Eight wells (W-1, W-12, W-23, W-28, W-31, W-32, W-33, and W-34) in AOI 10 exhibited concentrations of groundwater compounds of concern (COCs) above their respective MSCs. The COCs that were above the MSCs in these wells were modeled using the analytical results from the April 2011 groundwater sampling event, and the Quick Domenico Version 2 (QD) spreadsheet model developed by Pennsylvania Department of Environmental Protection (PADEP). Site-specific data was used to complete the fate and transport calculations, when available.

**G.2 MODEL OVERVIEW**

The QD Model is a Microsoft Excel spreadsheet application based on the analytical contaminant transport equation developed by P.A. Domenico in *"An Analytical Model For Multidimensional Transport of a Decaying Contaminant Species,"* Journal of Hydrology, 91 (1987), pp. 49-58. The QD model calculates contaminant concentrations at any down-gradient location after a specified interval of time. The model incorporates the processes of advection, first order decay, retardation, and dispersion to describe fate and transport of compounds. In addition, the QD model displays the results as a two dimensional chart to facilitate interpretation of the results.

**G.3 MODEL LIMITATIONS**

Limitations of the QD model include:

- Groundwater flow is assumed to be steady state, and one-dimensional;
- Aquifer properties are assumed to be reasonably uniform;
- Applicable only to unconsolidated aquifers;
- Intended for use primarily with dissolved organic compounds;

- Does not account for the transformation of parent compounds into daughter products as the result of biodegradation;
- Compounds are considered individually, and are assumed to not react with each other; and
- The contaminant source is limited to a single and continuous source concentration.

#### **G.4 MODEL INPUT PARAMETERS**

In preparation of this report, input values for the QD model were compiled from available site-specific data. When no site-specific data was available, estimated input values from the PADEP spreadsheet "Number Please! 2011" which is based on PA Code, Chapter 250, Appendix A, Table 5, or other acceptable literature sources, were utilized. The input parameters are discussed in detail in the following sections and are summarized in the input/output tables G.1 through G.4 in this appendix. An Excel spreadsheet interface was used to construct the QD simulations. This interface allowed the simulation of all relevant compounds at each well location to be constructed and saved in a single electronic file.

##### **G.4.1 Source Concentration**

Results of the April 2011 groundwater sampling indicated that three organic compounds (benzene, chrysene and naphthalene) and one metal (lead) were detected above their respective groundwater MSCs in shallow wells (W-1, W-12, W-23, W-28, W-31, W-32, W-33, and W-34). The potential for these compounds to migrate offsite (beyond property boundary or discharge to the Schuylkill River) was evaluated through the use of the QD model.

##### **G.4.2 Distance to Location of Concern (x)**

Distance to the Location of Concern (distance) for the current simulations is the distance required for each COCs concentration to fall below its respective MSC under steady-state plume conditions. The distance is iteratively entered using the Excel "Solver" Add-on in the QD model until the location where the COC concentration falls below the MSC is identified. This step is performed using a large simulation time of  $1 \times 10^{99}$  days to ensure that the plume has reached steady-state.



### **G.4.3 Dispersivity**

Dispersivity is the tendency of a dissolved plume to “spread out” as it moves down-gradient.

- Longitudinal dispersivity ( $A_x$ ) occurs in the direction parallel to groundwater flow;
- Transverse dispersivity ( $A_y$ ) occurs in the same plane as longitudinal dispersivity but perpendicular to the direction of groundwater flow; and
- Vertical dispersivity ( $A_z$ ) occurs in the upward direction, normal to the plane in which longitudinal and transverse dispersivity occur (Vertical dispersivity is usually negligible and is typically omitted from most QD analyses).

Dispersivity estimates are difficult to quantify and are commonly estimated from the following relationships:

1.  $A_x = X/10$  (where, X is the distance a contaminant has traveled by advective transport)
2.  $A_y = A_x/10$
3.  $A_z = A_x/20$  to  $A_x/100$  (generally, it is recommended that  $A_z$  be a very small number (0.001) unless vertical monitoring can reliably justify a larger number. Additionally, a value of 0.0001 is suggested for uncalibrated or conceptual applications).

As stated above the value for  $A_y$  was estimated to be 10 percent of  $A_x$ . A value of 0.001 was used as a value for  $A_z$ . A longitudinal dispersivity of 200 feet was assumed which is also the longitudinal dispersivity used in the CCR.

### **G.4.4 Lambda**

Lambda is the first order decay constant. It is determined by dividing 0.693 by the half-life of the compound. The value can typically be estimated for shrinking plumes by evaluating at concentrations versus time or distance. Lambda can also sometimes be estimated for stable plumes by evaluating concentration versus time using the methodology outlined in Buscheck and Alcantar (1995). Important considerations to estimating Lambda from site data include:

1. Are the measured concentrations along the centerline of the plume?
2. Are the measured concentrations the result of the single source area?
3. Are there no remedial systems and/or activities that effected the migration of the plume during the time interval of evaluation?

If the answer is yes to these questions, then the methodologies outlined in Buscheck and Alcantar may be utilized to estimate a site-specific lambda from site data.

Based on review of the available site data, the criteria necessary to calculate a site-specific lambda could not be met; therefore, a default value for lambda (when appropriate and available) was obtained from the PADEP spreadsheet "Number Please! 2011" which is based on PA Code, Chapter 250, Appendix A, Table 5.

#### **G.4.5 Source Dimensions**

Source width is the maximum width of the area measured perpendicular to the direction of groundwater flow. Source thickness is the thickness of the contaminated soils below the water table that contribute contamination to groundwater. In addition to the saturated zone, fluctuation in groundwater elevation may create a smear zone in the unsaturated portion of an aquifer. As an estimate of the thickness of the smear zone, average fluctuation can be used. Since no plumes have been delineated, a source width of 100 ft was used. The source thicknesses used was 60 feet (ft), which is the average saturated thickness of the upper unconfined aquifer based on cross sections DD-DD' and EE-EE.'

#### **G.4.6 Hydraulic Conductivity (K)**

The hydraulic conductivity of a geologic material is a measure of its ability to transmit water. A hydraulic conductivity of 4.64 ft/d was used in the AOI 10 QD simulations. This value was the average hydraulic conductivity of the fill/alluvium at the site, obtained from the CCR. The wells that were modeled are screened in the fill/alluvium.

#### **G.4.7 Hydraulic Gradient**

Hydraulic gradient is the change in hydraulic head relative to the distance between head measurement locations. The hydraulic gradient is measured parallel to the direction of ground water flow assuming horizontal flow and a uniform gradient. Using the groundwater elevations collected in April 2011, the hydraulic gradient value was estimated between W-31 and W-16 and is 0.0046. This hydraulic gradient was used in all eight QD simulations due the limited number of wells on AOI 10 that fall on or near the same flow path.

#### **G.4.8 Porosity (n)**

Porosity is measured as the ratio of the volume of void space in a geologic material to the total volume of material. A porosity of 0.35 was used in the fate and transport modeling and is based on historical geotechnical analysis of site alluvial sediments.

#### **G.4.9 Soil Bulk Density ( $\rho_b$ )**

Soil bulk density is the dry weight of a sample divided by the total volume of the sample in an undisturbed state. Soil bulk density can either be determined by a laboratory or by the equation

$$\rho_b = 2.65 * (1 - n).$$

Soil bulk density value used in the fate and transport modeling was 1.72 gm/cm<sup>3</sup> which is based on historical geotechnical analysis.

#### **G.4.10 Organic Carbon Partition Coefficient (KOC)**

The organic carbon partition coefficient is chemical specific and was taken from the PADEP EP spreadsheet "Number Please! 2011" which is based on PA Code, Chapter 250, Appendix A, Table 5. Koc is chemical specific and can be found in the QD model input-out tables.

#### **G.4.11 Fraction Organic Carbon (foc)**

The fraction of organic carbon is the organic carbon content of a soil. A laboratory using ASTM methods can determine this value. Samples for organic carbon are taken from the same soil horizon in which the contaminant occurs, but outside of the impacted area. Since no site specific fraction of organic carbon data was available for the site, the fate and transport modeling used the model-recommended default concentration of 0.005, which is a conservative value based on the description of site soils.

#### **G.4.12 Time (t)**

'Time zero' is the point at which contamination was introduced into the aquifer. Time since 'time zero' is measured in days. The final simulation time of  $1 \times 10^{99}$  days was used to ensure that a steady-state plume was simulated.

### **G.5 OUTPUT DATA AND RESULTS**

A spreadsheet for each well, for which a QD simulation was performed, is included at the end of this appendix (Tables G.1 through G.8). Table G.9 is a summary of the QD modeling results. QD model results indicate a low to negligible potential for impacted groundwater to migrate beyond the AOI 10 property boundary. The benzene concentration at W-33 of 250 ug/l has some potential to migrate slightly (about 100 ft) beyond the AOI 10 property boundary.

**Table G.1**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
 Prepared by Terrance Stanley  
 Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-01      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{OC}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |         | Data Source               |
|------------------------------------|--|-------------------|---------|---------------------------|
| <b>Sim 1</b>                       |  |                   |         |                           |
| Contaminant                        |  |                   | benzene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0200  | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001   | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58      | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0200                        | 0.005                                      | 0.005                          | 80                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.2**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
 Prepared by Terrance Stanley  
 Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-12      |                                                        |
| Sample Date                        |          |                   | 4/26/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{OC}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |         | Data Source               |
|------------------------------------|--|-------------------|---------|---------------------------|
| <b>Sim 1</b>                       |  |                   |         |                           |
| Contaminant                        |  |                   | benzene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0080  | 4/26/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001   | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58      | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0080                        | 0.005                                      | 0.005                          | 28                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.



**Table G.3**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
Prepared by Terrance Stanley  
Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-23      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{OC}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |         | Data Source               |
|------------------------------------|--|-------------------|---------|---------------------------|
| <b>Sim 1</b>                       |  |                   |         |                           |
| Contaminant                        |  |                   | benzene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0120  | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001   | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58      | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0120                        | 0.005                                      | 0.005                          | 50                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.4**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
 Prepared by Terrance Stanley  
 Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-28      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{OC}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |          | Data Source               |
|------------------------------------|--|-------------------|----------|---------------------------|
| <b>Sim 1</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | chrysene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0020   | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.000    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 490000   | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - chrysene                                                                     | 0.0020                        | 0.002                                      | 0.002                          | <1                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.5**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project  
Prepared by  
Date Prepared

2574601 - Sunoco Philadelphia Refinery  
Terrance Stanley  
6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-31      |                                                        |
| Sample Date                        |          |                   | 4/26/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium based on site-wide slug testing               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{oc}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |          | Data Source               |
|------------------------------------|--|-------------------|----------|---------------------------|
| <b>Sim 1</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | benzene  |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0100   | 4/26/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58       | PADEP Number Please! 2011 |
| <b>Sim 2</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | chrysene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0040   | 4/26/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.000    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 490000   | PADEP Number Please! 2011 |
| <b>Sim 3</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | lead     |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0060   | 4/26/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.000    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 0.000    | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0100                        | 0.005                                      | 0.005                          | 40                                                                                     |
| Sim 2 - chrysene                                                                     | 0.0040                        | 0.002                                      | 0.002                          | 1                                                                                      |
| Sim 3 - lead                                                                         | 0.0060                        | 0.005                                      | 0.005                          | 32                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.6**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
Prepared by Terrance Stanley  
Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-32      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{oc}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |          | Data Source               |
|------------------------------------|--|-------------------|----------|---------------------------|
| <b>Sim 1</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | benzene  |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0560   | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58       | PADEP Number Please! 2011 |
| <b>Sim 2</b>                       |  |                   |          |                           |
| Contaminant                        |  |                   | chrysene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0040   | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.000    | PADEP Number Please! 2011 |
| KOC                                |  |                   | 490000   | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0560                        | 0.005                                      | 0.005                          | 147                                                                                    |
| Sim 2 - chrysene                                                                     | 0.0040                        | 0.002                                      | 0.002                          | 1                                                                                      |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.7**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
 Prepared by Terrance Stanley  
 Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-33      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{oc}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |             | Data Source               |
|------------------------------------|--|-------------------|-------------|---------------------------|
| <b>Sim 1</b>                       |  |                   |             |                           |
| Contaminant                        |  |                   | benzene     |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.2500      | 4/24/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001       | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58          | PADEP Number Please! 2011 |
| <b>Sim 2</b>                       |  |                   |             |                           |
| Contaminant                        |  |                   | chrysene    |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0060      | 40657.0000                |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.000       | PADEP Number Please! 2011 |
| KOC                                |  |                   | 490000      | PADEP Number Please! 2011 |
| <b>Sim 3</b>                       |  |                   |             |                           |
| Contaminant                        |  |                   | naphthalene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.3300      | 40657.0000                |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.003       | PADEP Number Please! 2011 |
| KOC                                |  |                   | 950         | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.2500                        | 0.005                                      | 0.005                          | 255                                                                                    |
| Sim 2 - chrysene                                                                     | 0.0060                        | 0.002                                      | 0.002                          | 2                                                                                      |
| Sim 3 - naphthalene                                                                  | 0.3300                        | 0.100                                      | 0.100                          | 16                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.

**Table G.8**  
**Quick Domenico**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

Project 2574601 - Sunoco Philadelphia Refinery  
 Prepared by Terrance Stanley  
 Date Prepared 6/23/2011

| Generic Input Parameters           |          |                   |           | Data Source                                            |
|------------------------------------|----------|-------------------|-----------|--------------------------------------------------------|
| Source Identification (or Well ID) |          |                   | W-34      |                                                        |
| Sample Date                        |          |                   | 4/27/2011 |                                                        |
| Source Width                       |          | ft                | 100       | Delineated LNAPL (100' default if no plume is present) |
| Source Thickness                   |          | ft                | 60        | Estimated from cross-sections DD-DD' & EE-EE'          |
| Longitudinal Dispersivity          | $A_x$    | ft                | 200       | From CCR QD Simulations                                |
| Transverse Dispersivity            | $A_y$    | ft                | 20.0      | Quick Domenico User's Manual                           |
| Vertical Dispersivity              | $A_z$    | ft                | 0.0001    | Quick Domenico User's Manual                           |
| Hydraulic Conductivity             | k        | ft/day            | 4.64      | Alluvium                                               |
| Hydraulic Gradient                 |          | ft/ft             | 0.0046    | W-31/W-16 April 2011                                   |
| Porosity                           |          | decimal fraction  | 0.35      | Site soil analyses                                     |
| Soil Bulk Density                  | $\rho_b$ | g/cm <sup>3</sup> | 1.7225    | ACT 2 TGM Default                                      |
| Fraction of Organic Carbon         | $f_{OC}$ | decimal fraction  | 0.005     | ACT 2 TGM Default                                      |
| Time                               |          | days              | 1.00E+99  | Steady-State Conditions                                |

| Chemical Specific Input Parameters |  |                   |         | Data Source               |
|------------------------------------|--|-------------------|---------|---------------------------|
| <b>Sim 1</b>                       |  |                   |         |                           |
| Contaminant                        |  |                   | benzene |                           |
| Source Concentration (mg/L)        |  | mg/L              | 0.0120  | 4/27/2011                 |
| Lambda (per day)                   |  | day <sup>-1</sup> | 0.001   | PADEP Number Please! 2011 |
| KOC                                |  |                   | 58      | PADEP Number Please! 2011 |

| Output (Distance from Source Where Concentration Equals Respective Ground Water MSC) |                               |                                            |                                |                                                                                        |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Contaminant                                                                          | Starting Concentration (mg/L) | GW MSC <sup>1</sup> Non-Residential (mg/L) | Predicted Concentration (mg/L) | Predicted Distance to Meet Non-Residential GW MSC (Rounded Upward to the Nearest foot) |
| Sim 1 - benzene                                                                      | 0.0120                        | 0.005                                      | 0.005                          | 50                                                                                     |

<sup>1</sup> ACT 2 TGM, Appendix A, Table 1 MSC for a Non-residential Used Aquifer with Total Dissolved Solids less than or equal to 2500.



**Table G.9**  
**Fate and Transport Model Input and Output AOI 10**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Well ID | Compound   | Starting Concentration | Final Concentration<br>(Screening Value) | Predicted Distance to<br>Achieve Screening Value | Estimated Distance to<br>AOI 10 Boundary |
|---------|------------|------------------------|------------------------------------------|--------------------------------------------------|------------------------------------------|
|         |            | ug/l                   | ug/l                                     | ft                                               | ft                                       |
| W-1     | benzene    | 20                     | 5                                        | 80                                               | 90                                       |
| W-12    | benzene    | 8                      | 5                                        | 28                                               | 105                                      |
| W-23    | benzene    | 12                     | 5                                        | 50                                               | 98                                       |
| W-28    | chrysene   | 2                      | 1.9                                      | <1                                               | 180                                      |
| W-31    | benzene    | 10                     | 5                                        | 40                                               | 270                                      |
|         | chrysene   | 4                      | 1.9                                      | 1                                                |                                          |
|         | lead       | 6                      | 5                                        | 32                                               |                                          |
| W-32    | benzene    | 56                     | 5                                        | 147                                              | 170                                      |
|         | chrysene   | 4                      | 1.9                                      | 1                                                |                                          |
| W-33    | benzene    | 250                    | 5                                        | 255                                              | 90                                       |
|         | chrysene   | 6                      | 1.9                                      | 2                                                |                                          |
|         | napthalene | 330                    | 100                                      | 16                                               |                                          |
| W-34    | benzene    | 12                     | 5                                        | 50                                               | 130                                      |

Note:

= indicates predicted distance is greater than distance to property boundary

## **APPENDIX H**

### Development of Site-Specific Standards and Risk Assessment

**APPENDIX H**  
**DEVELOPMENT OF SITE-SPECIFIC STANDARDS**  
**AOI 10: SUNOCO PHILADELPHIA REFINERY**  
**PHILADELPHIA, PENNSYLVANIA**

Based on the current and future intended non-residential site use, an exposure assessment was conducted for all compounds in surficial soil (0-2 feet) which exceeded the nonresidential direct contact statewide health standards in AOI 10. Potential human health exposures for the Refinery are evaluated for an industrial worker scenario.

In AOI 10, soil samples were collected from within the EPA designated Corrective Action Management Unit (CAMU) and around the perimeter the of the CAMU and analyzed for the full suite of VOCs, SVOCs, and Metals; and, samples were collected outside the CAMU designated area and analyzed for the site-specific compounds (as specified in the February 2011 AOI 10 Site Characterization Workplan). To determine if any risk to the industrial worker exist due to direct contact, these samples were compared to the non-residential direct contact medium specific concentrations [PA Code Title 25, Chapter 250.305, Appendix A, Tables 3A and 4A]. Within the CAMU designated area concentrations of benzo(a)pyrene and dibenzo(a,h)anthracene were detected above their respective direct contact MSCs. Outside the CAMU designated area concentrations of arsenic, benzo(a)pyrene, and lead were detected above their respective direct contact MSCs. In accordance with Section IV of the PADEP's Technical Guidance Manual (TGM) (dated June 8, 2002), the COCs listed above were further screened against the EPA Region III Risk-Based Concentrations RBCs (aka, EPA Regional Screening Levels) for industrial soil to potentially reduce the list of compounds carried through the risk assessment; however, the above listed compounds also exceeded Region III's RBCs.

For any compounds that exceed both the non-residential statewide health standards and EPA Region III RBCs, site-specific standards were calculated using PADEP default intake parameters for an on-site worker and, where appropriate, a risk level of  $10^{-4}$ . For calculating a site-specific standard for on-site workers exposed to lead, Sunoco used the Society of Environmental Geochemistry and Health (SEGH) model used by PADEP to

develop the non-residential MSC. The input parameters used to develop the site-specific standards for arsenic [non-carcinogenic and carcinogenic], benzo(a)pyrene, dibenzo(a,h)anthracene and lead are provided in Tables H-1 through H-5.

The calculated site-specific standards are as follows:

| Compound                                  | Calculated Site-Specific Standard (mg/kg) |
|-------------------------------------------|-------------------------------------------|
| Arsenic [non-carcinogenic / carcinogenic] | 8,520 / 529*                              |
| Benzo(a)pyrene                            | 109                                       |
| Dibenzo(a,h)anthracene                    | 109                                       |
| Lead                                      | 1,708                                     |

*\*Arsenic has both carcinogenic and non-carcinogenic toxicological effects therefore both criteria were calculated. For characterization the lower, more stringent standard, will be used to screen the analytical data.*

The site-specific screening levels for arsenic, benzo(a)pyrene, and dibenzo(a,h)anthracene were calculated for ingestion based on the calculations specified in 25 Pa. Code § 250.306(b). These calculations used the PADEP's default parameters and an updated target risk level of 1E-4, in consideration of the site-specific conditions (PADEP's default target risk level is 1E-5).

The site-specific screening level for lead was also calculated for ingestion. As presented in 25 Pa. Code § 250.306(e), Appendix A, Table 7, the non-residential soil screening value for lead is based on the method presented in the report 'The Society for Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil' (Wixson, 1991). The model used by the PADEP and developed by SEGH was also used to calculate the site specific criterion for the refinery. Based on the SEGH model and PADEP's default parameters, PADEP's non-residential direct contact MSC default value for lead in surface soil is 1,000 mg/kg. To develop a site-specific criteria for lead, some of the parameters used by the PADEP were updated in consideration of site-specific conditions and updated lead data collected from recent studies. These parameters are discussed in the following paragraphs.

Target blood lead concentration (T) – The default target blood lead concentration used by the PADEP to develop the non-residential MSC is 20 ug/dL; however, the Center for Disease Control (CDC) recommends that worker blood lead levels be maintained below 25 ug/dL (NIOSH, 2008) to prevent adverse health effects for most workers from exposure to lead throughout a working lifetime. Based on conversations between representatives of Sunoco and EPA, the target lead blood level identified by the CDC is the level used in the site-specific calculations in Tables H-5 and H-6.

Geometric mean background blood lead concentration (B) – B is the background blood lead concentration in the target population from sources other than soil and dust. The PADEP's default value for B is 4 ug/dL and, as summarized in PADEPs reference document (Wixson, 1991), is based on data gathered in the United Kingdom from young children. The US Center for Disease Control and Prevention (CDC) in Atlanta, GA has monitored blood lead levels in US children and adults since 1976 and, based on the most recent results published by the National Center for Environmental Health of the CDC (NCEH, 2005), the mean blood lead concentration for an adult 20 years of age or older is 1.56 ug/dL. Based on the more recent study by the US CDC, the value used for B in the site specific calculation has been revised to 1.56 ug/dL.

## **CONCLUSIONS**

To complete the assessment, the samples collected outside the CAMU were screened separate from the samples collected within the CAMU (Tables H-6 and H-7, respectively). Outside the CAMU, results for arsenic, benzo(a)pyrene, and lead were compared to the calculated site-specific standards. No concentrations of arsenic or benzo(a)pyrene were detected above the site-specific standards; however, concentrations of lead were detected above the site-specific standard in six sample locations. Within the CAMU, results for benzo(a)pyrene and dibenzo(a,h)anthracene were compared to site-specific standards. No concentrations of dibenzo(a,h)anthracene were detected above the site-specific standard; however, a concentration of benzo(a)pyrene was detected above the site-specific standard in one sample location.

In addition to comparing the individual results to the site-specific standards the cumulative risk of exposure to arsenic, benzo(a)pyrene, and dibenzo(a,h)anthracene was also calculated for the samples collected outside and within the CAMU (Tables H-6 and H-7, respectively). Based on the PADEPs TGM, the total cumulative risk for exposure to carcinogenic compounds should not exceed  $1\text{E-}4$  and the cumulative hazard index for exposure to non-carcinogenic compounds should not exceed 1. Lead exposure is dependent on the blood/lead concentration and not risk based; therefore, lead could not be incorporated into the cumulative risk calculation.

As presented in Tables H-6 and H-7:

- The total cumulative hazard index for exposure to the non-carcinogenic compound arsenic is less than the PADEP's requirement of 1.0.
- The total cumulative risk for exposure to carcinogens outside the CAMU is  $1.61\text{E-}04$ , is greater than the acceptable limits.
- The total cumulative risk for exposure to carcinogens within the CAMU is  $1.83\text{E-}04$ , is greater than the acceptable limits.

### **References**

NCEH (2005). Third National Report on Human Exposure to Environmental Chemicals. Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences. Atlanta, Georgia. NCEH. Pub. No. 05-0570.

NIOSH (2008). Adult Blood Lead Epidemiology and Surveillance (ABLES). <http://www.cdc.gov/niosh/topics/ABLES>

Wixson, B.G., (1991). The Society of Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil. Trace Substances in Environmental Health. 11-20.



**Table H-1**  
**Derivation of Site-Specific Soil Value**  
**for Arsenic (Non-Carcinogenic)<sup>1</sup>**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Parameter              | Abbreviation     | Assumption | Units                   | Source                                |
|------------------------|------------------|------------|-------------------------|---------------------------------------|
| Target Health Quotient | THQ              | 1          |                         | 25 Pa. Code § 250.306(d)              |
| Oral Reference Dose    | RfD <sub>o</sub> | 0.003      | mg/kg-day <sup>-1</sup> | 25 Pa. Code § 250, Appendix A Table 5 |
| Body Weight            | BW               | 70         | kg                      | 25 Pa. Code § 250.306(d)              |
| Averaging Time         | AT <sub>DC</sub> | 25         | yr                      | 25 Pa. Code § 250.306(d)              |
| Absorption             | Abs              | 1          | unitless                | 25 Pa. Code § 250.306(d)              |
| Exposure Frequency     | EF               | 180        | d/yr                    | 25 Pa. Code § 250.306(d)              |
| Exposure Duration      | ED               | 25         | yr                      | 25 Pa. Code § 250.306(d)              |
| Conversion Factor      | CF               | 1.00E-06   | kg/day                  | 25 Pa. Code § 250.306(d)              |
| Ingestion Rate         | IngR             | 50         | mg/day                  | 25 Pa. Code § 250.306(d)              |

**Site-Specific, Non-Residential (Onsite Worker) Screening Value**

**8,520 mg/kg**

Notes:

1. The site specific screening value was calculated for ingestion based on the calculation specified in 25 Pa. Code 250.306(b)

$$\text{MSC (mg/kg)} = \frac{\text{THQ} \times \text{RfD}_o \times \text{BW} \times \text{AT}_{DC} \times 365 \text{ days/year}}{\text{Abs} \times \text{EF} \times \text{ED} \times \text{IngR} \times \text{CF}}$$

**Table H-2**  
**Derivation of Site-Specific Soil Value**  
**for Arsenic (Carcinogenic)<sup>1</sup>**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Parameter                      | Abbreviation      | Assumption | Units                   | Source                                |
|--------------------------------|-------------------|------------|-------------------------|---------------------------------------|
| Absorption                     | ABS               | 1          | unitless                | 25 Pa. Code § 250.306(d)              |
| Exposure Frequency             | EF                | 180        | d/yr                    | 25 Pa. Code § 250.306(d)              |
| Conversion Factor              | CF                | 1.00E-06   | kg/day                  | 25 Pa. Code § 250.306(d)              |
| Target Risk <sup>2</sup>       | TR                | 1.00E-04   | mg/kg                   |                                       |
| Oral Cancer Slope Factor       | CSF <sub>o</sub>  | 1.5        | mg/kg-day <sup>-1</sup> | 25 Pa. Code § 250, Appendix A Table 5 |
| Averaging Time for Carcinogens | AT <sub>c</sub>   | 70         | yr                      | 25 Pa. Code § 250.306(d)              |
| Ingestion Factor               | IF <sub>adj</sub> | 17.9       | mg-yr/kg-day            | 25 Pa. Code § 250.306(d)              |

**Site-Specific, Non-Residential (Onsite Worker) Screening Value**

**529 mg/kg**

Notes:

- The site specific screening value was calculated for ingestion based on the calculation specified in 25 Pa. Code 250.306(b)  

$$MSC \text{ (mg/kg)} = \frac{TR \times AT_c \times 365 \text{ days/year}}{CSF_o \times Abs \times EF \times IF_{adj} \times CF}$$
- The target risk level was modified from PADEP's default (1E-5) to 1E-4.

**Table H-3**  
**Derivation of Site-Specific Soil Value**  
**for Benzo(a)pyrene<sup>1</sup>**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Parameter                      | Abbreviation      | Assumption | Units                   | Source                                |
|--------------------------------|-------------------|------------|-------------------------|---------------------------------------|
| Absorption                     | ABS               | 1          | unitless                | 25 Pa. Code § 250.306(d)              |
| Exposure Frequency             | EF                | 180        | d/yr                    | 25 Pa. Code § 250.306(d)              |
| Conversion Factor              | CF                | 1.00E-06   | kg/day                  | 25 Pa. Code § 250.306(d)              |
| Target Risk <sup>2</sup>       | TR                | 1.00E-04   | mg/kg                   |                                       |
| Oral Cancer Slope Factor       | CSF <sub>o</sub>  | 7.3        | mg/kg-day <sup>-1</sup> | 25 Pa. Code § 250, Appendix A Table 5 |
| Averaging Time for Carcinogens | AT <sub>c</sub>   | 70         | yr                      | 25 Pa. Code § 250.306(d)              |
| Ingestion Factor               | IF <sub>adj</sub> | 17.9       | mg-yr/kg-day            | 25 Pa. Code § 250.306(d)              |

**Site-Specific, Non-Residential (Onsite Worker) Screening Value**

**109 mg/kg**

Notes:

- The site specific screening value was calculated for ingestion based on the calculation specified in 25 Pa. Code 250.306(b)  

$$MSC \text{ (mg/kg)} = \frac{TR \times AT_c \times 365 \text{ days/year}}{CSF_o \times Abs \times EF \times IF_{adj} \times CF}$$
- The target risk level was modified from PADEP's default (1E-5) to 1E-4.

**Table H-4**  
**Derivation of Site-Specific Soil Value**  
**for Dibenzo(a,h)anthracene<sup>1</sup>**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Parameter                      | Abbreviation      | Assumption | Units                   | Source                                |
|--------------------------------|-------------------|------------|-------------------------|---------------------------------------|
| Absorption                     | ABS               | 1          | unitless                | 25 Pa. Code § 250.306(d)              |
| Exposure Frequency             | EF                | 180        | d/yr                    | 25 Pa. Code § 250.306(d)              |
| Conversion Factor              | CF                | 1.00E-06   | kg/day                  | 25 Pa. Code § 250.306(d)              |
| Target Risk <sup>2</sup>       | TR                | 1.00E-04   | mg/kg                   |                                       |
| Oral Cancer Slope Factor       | CSF <sub>o</sub>  | 7.3        | mg/kg-day <sup>-1</sup> | 25 Pa. Code § 250, Appendix A Table 5 |
| Averaging Time for Carcinogens | AT <sub>c</sub>   | 70         | yr                      | 25 Pa. Code § 250.306(d)              |
| Ingestion Factor               | IF <sub>adj</sub> | 17.9       | mg-yr/kg-day            | 25 Pa. Code § 250.306(d)              |

**Site-Specific, Non-Residential (Onsite Worker) Screening Value**

**109 mg/kg**

Notes:

- The site specific screening value was calculated for ingestion based on the calculation specified in 25 Pa. Code 250.306(b)  

$$MSC \text{ (mg/kg)} = \frac{TR \times AT_c \times 365 \text{ days/year}}{CSF_o \times Abs \times EF \times IF_{adj} \times CF}$$
- The target risk level was modified from PADEP's default (1E-5) to 1E-4.

**Table H-5**  
**Derivation of Site-Specific Soil Value**  
**for Lead<sup>1</sup>**  
**AOI 10 Site Characterization/Remedial Investigation Report**  
**Sunoco Philadelphia Refinery**  
**Philadelphia, Pennsylvania**

| Parameter                                                                                                   | Abbreviation | Assumption | Units                   | Source <sup>2</sup>                   |
|-------------------------------------------------------------------------------------------------------------|--------------|------------|-------------------------|---------------------------------------|
| Blood lead target concentration                                                                             | T            | 25         | ug/dL                   | CDC - ABLES (NIOSH, 2008)             |
| Geometric standard deviation of the blood lead distribution                                                 | G            | 1.4        | unitless                | 25 Pa. Code § 250, Appendix A Table 7 |
| Background blood lead concentration in the population from sources other than soil or dust                  | B            | 1.56       | ug/dL                   | NCEH Pub. No. 05-0570 (NCEH, 2005)    |
| Number of standard deviations corresponding to the degree of protection required for the population at risk | n            | 1.645      | unitless                | 25 Pa. Code § 250, Appendix A Table 7 |
| Response of the blood lead versus soil lead relationship                                                    | δ            | 7.5        | ug/dL blood / ug/g soil | 25 Pa. Code § 250, Appendix A Table 7 |

**Site-Specific, Non-Residential (Onsite Worker) Screening Value**

**1,708 ug/g (mg/kg)**

Notes:

1. The site specific screening value for lead was calculated for ingestion based on the SEGH model as specified by 25 Pa. Code 250.306(e)

$$MSC \text{ (mg/kg)} = \frac{[(T/G^n) - B] \times 1000}{\delta}$$

2. Sources for blood lead target level (T) based on conversation between James Oppenheim of Sunoco and Hon Lee of EPA in November 2010.

NIOSH (2008). Adult Blood Lead Epidemiology and Surveillance (ABLES). <http://www.cdc.gov/niosh/topics/ABLES>

NCEH (2005). Third National Report on Human Exposure to Environmental Chemicals. Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences. Atlanta, Georgia. NCEH. Pub. No. 05-0570.



Table H-6  
Site Specific Cumulative Risk Evaluation for the Area Outside of the Corrective Action Management Unit (CAMU)  
AOI 10 Site Characterization/Remedial Investigaiton Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

|                   |               |                 |             | Arsenic (7440-38-2)     |                            | Arsenic (7440-38-2)     |                 | Benzo(a)pyrene (50-32-8) |                 | Lead (7439-92-1)        |                                               |
|-------------------|---------------|-----------------|-------------|-------------------------|----------------------------|-------------------------|-----------------|--------------------------|-----------------|-------------------------|-----------------------------------------------|
| Location ID       | Sample ID     | Sample Interval | Sample Date | Reported Result (mg/kg) | Calculated Hazard Quotient | Reported Result (mg/kg) | Calculated Risk | Reported Result (mg/kg)  | Calculated Risk | Reported Result (mg/kg) | Blood Lead Concentration <sup>5</sup> (ug/dL) |
| BH-10-36          | BH-10-36_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 1.8                      | 1.66E-06        | 390                     | 8                                             |
| BH-10-37          | BH-10-37_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 6.5                      | 5.98E-06        | 540                     | 10                                            |
| BH-10-38          | BH-10-38_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | ND                       | --              | 11.6                    | 3                                             |
| BH-10-39          | BH-10-39_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 16                       | 1.47E-05        | 415                     | 8                                             |
| BH-10-40          | BH-10-40_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 9.2                      | 8.47E-06        | 65.1                    | 4                                             |
| BH-10-41          | BH-10-41_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | ND                       | --              | 186                     | 5                                             |
| BH-10-42          | BH-10-42_0-2' | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 1.3                      | 1.20E-06        | 249                     | 6                                             |
| BH-10-47          | BH-10-47_0-2' | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 0.82                     | 7.55E-07        | 233                     | 6                                             |
| BH-10-49          | BH-10-49_0-2' | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 0.14                     | 1.29E-07        | 340                     | 7                                             |
| BH-10-50          | BH-10-50_0-2' | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 1.3                      | 1.20E-06        | 84.7                    | 4                                             |
| BH-10-53          | BH-10-53_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 0.39                     | 3.59E-07        | 3310                    | 46                                            |
| BH-10-54          | BH-10-54_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 2.5                      | 2.30E-06        | 186                     | 5                                             |
| BH-10-59          | BH-10-59_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 1.6                      | 1.47E-06        | 401                     | 8                                             |
| BH-10-60          | BH-10-60_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 10                       | 9.21E-06        | 777                     | 13                                            |
| BH-10-61          | BH-10-61_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 0.58                     | 5.34E-07        | 118                     | 4                                             |
| BH-10-62          | BH-10-62_0-2' | 0-2             | 4/22/2011   | NA                      | --                         | NA                      | --              | 2.4                      | 2.21E-06        | 2580                    | 36                                            |
| BH-10-66          | BH-10-66_0-2' | 0-2             | 4/21/2011   | NA                      | --                         | NA                      | --              | 0.065                    | 5.98E-08        | 250                     | 6                                             |
| BH-10-67          | BH-10-67_0-2' | 0-2             | 4/21/2011   | NA                      | --                         | NA                      | --              | 0.57                     | 5.25E-07        | 985                     | 16                                            |
| BH-10-71          | BH-10-71_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 0.51                     | 4.69E-07        | 244                     | 6                                             |
| BH-10-72          | BH-10-72_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 49                       | 4.51E-05        | 946                     | 15                                            |
| BH-10-73          | BH-10-73_0-2' | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | ND                       | --              | 4550                    | 62                                            |
| BH-10-76          | BH-10-76_0-2' | 0-2             | 4/20/2011   | NA                      | --                         | NA                      | --              | 1.8                      | 1.66E-06        | 1990                    | 29                                            |
| BH-10-78          | BH-10-78_0-2' | 0-2             | 4/21/2011   | NA                      | --                         | NA                      | --              | 0.66                     | 6.08E-07        | 79.3                    | 4                                             |
| BH-10-79          | BH-10-79_0-2' | 0-2             | 4/21/2011   | NA                      | --                         | NA                      | --              | 0.046                    | 4.23E-08        | 145                     | 5                                             |
| BH-10-80          | BH-10-80_0-2' | 0-2             | 4/21/2011   | NA                      | --                         | NA                      | --              | 1.4                      | 1.29E-06        | 234                     | 6                                             |
| W-1D              | W-1D_0-2'     | 0-2             | 4/5/2011    | NA                      | --                         | NA                      | --              | 2.7                      | 2.49E-06        | 76.5                    | 4                                             |
| W-28              | W-28_0-2'     | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 0.39                     | 3.59E-07        | 181                     | 5                                             |
| W-29              | W-29_0-2'     | 0-2             | 4/19/2011   | NA                      | --                         | NA                      | --              | 0.84                     | 7.73E-07        | 259                     | 6                                             |
| W-30              | W-30@0'-2'    | 0-2             | 4/15/2011   | NA                      | --                         | NA                      | --              | ND                       | --              | 1990                    | 29                                            |
| W-31              | W-31@0'-2'    | 0-2             | 4/15/2011   | NA                      | --                         | NA                      | --              | 0.59                     | 5.43E-07        | 955                     | 15                                            |
| W-32D             | W-32D_0-2'    | 0-2             | 4/7/2011    | NA                      | --                         | NA                      | --              | 0.43                     | 3.96E-07        | 1200                    | 18                                            |
| W-33              | W-33_0-2'     | 0-2             | 4/20/2011   | NA                      | --                         | NA                      | --              | 0.2                      | 1.84E-07        | 297                     | 7                                             |
| W-34              | W-34_0-2'     | 0-2             | 4/20/2011   | NA                      | --                         | NA                      | --              | 0.54                     | 4.97E-07        | 561                     | 10                                            |
| BH-10-43          | BH-10-43_0-2' | 0-2             | 4/14/2011   | 14.7                    | 0.002                      | 14.7                    | 2.78E-06        | ND                       | --              | 167                     | 5                                             |
| BH-10-48          | BH-10-48_0-2' | 0-2             | 4/14/2011   | 20                      | 0.002                      | 20                      | 3.78E-06        | 0.42                     | 3.87E-07        | 278                     | 6                                             |
| BH-10-51          | BH-10-51_0-2' | 0-2             | 4/14/2011   | 21.3                    | 0.003                      | 21.3                    | 4.03E-06        | 0.45                     | 4.14E-07        | 1720                    | 25                                            |
| BH-10-52          | BH-10-52_0-2' | 0-2             | 4/14/2011   | 12.2                    | 0.001                      | 12.2                    | 2.31E-06        | 0.59                     | 5.43E-07        | 1480                    | 22                                            |
| BH-10-57          | BH-10-57_0-2' | 0-2             | 4/21/2011   | 21.1                    | 0.002                      | 21.1                    | 3.99E-06        | ND                       | --              | 743                     | 12                                            |
| BH-10-58          | BH-10-58_0-2' | 0-2             | 4/14/2011   | 18.6                    | 0.002                      | 18.6                    | 3.52E-06        | ND                       | --              | 941                     | 15                                            |
| BH-10-65          | BH-10-65_0-2' | 0-2             | 4/14/2011   | 8.71                    | 0.001                      | 8.71                    | 1.65E-06        | ND                       | --              | 307                     | 7                                             |
| BH-10-68          | BH-10-68_0-2' | 0-2             | 4/14/2011   | 7.99                    | 0.001                      | 7.99                    | 1.51E-06        | ND                       | --              | 94.2                    | 4                                             |
| BH-10-75          | BH-10-75_0-2' | 0-2             | 4/19/2011   | 61.3                    | 0.007                      | 61.3                    | 1.16E-05        | 2.8                      | 2.58E-06        | 192                     | 5                                             |
| BH-10-81          | BH-10-81_0-2' | 0-2             | 4/21/2011   | 38.9                    | 0.005                      | 38.9                    | 7.36E-06        | 2.7                      | 2.49E-06        | 242                     | 6                                             |
| BH-10-82          | BH-10-82_0-2' | 0-2             | 4/20/2011   | 17                      | 0.002                      | 17                      | 3.22E-06        | 0.96                     | 8.84E-07        | 584                     | 10                                            |
| BH-10-83          | BH-10-83_0-2' | 0-2             | 4/21/2011   | 13.7                    | 0.002                      | 13.7                    | 2.59E-06        | 0.68                     | 6.26E-07        | 402                     | 8                                             |
| Cumulative Total: |               |                 |             |                         | 0.030                      | 4.83E-05                |                 | 1.13E-04                 |                 |                         |                                               |

Maximum Total Cumulative Risk for Carcinogens: 1.61E-04 > 1 in 10,000  
Maximum Hazard Index for Non-Carcinogens: 0.03000 < 1

Notes:  
ND - Not Detected Above Lab Reporting Limit  
NA - Arsenic is not a site-specific compound and therefore not analyzed on a site-wide basis.  
(1) All soil samples collected and analyzed were unsaturated.  
(2) All samples are located outside SWMU/CAMU areas.  
(3) Maximum Total Cumulative Risk is the combined risk of exposure to the detected concentrations of carcinogenic compounds arsenic and BaP and should be less than 1 in 10,000.  
(4) Maximum Hazard Index is the combined risk of exposure to the detected concentrations of the non-carcinogenic compound arsenic and should be less than 1.  
(5) Calculated based on site specific parameters provided in Table F-4. The CDC (NIOSH, 2008) recommends that blood lead levels be maintained below 25 ug/dL.



Table H-7  
Site Specific Cumulative Risk Evaluation for the Corrective Action Management Unit (CAMU)  
AOI 10 Site Characterization/Remedial Investigaiton Report  
Sunoco Philadelphia Refinery  
Philadelphia, Pennsylvania

|                   |                   |                 |             | Benzo(a)pyrene (50-32-8) |                 | Dibenzo(a,h)anthracene (53-70-3) |                 |
|-------------------|-------------------|-----------------|-------------|--------------------------|-----------------|----------------------------------|-----------------|
| Location ID       | Sample ID         | Sample Interval | Sample Date | Reported Result (mg/kg)  | Calculated Risk | Reported Result (mg/kg)          | Calculated Risk |
| BH-10-44          | BH-10-44-WC_0-2'  | 0-2             | 40645       | 0.18                     | 1.66E-07        | ND                               | --              |
| BH-10-45          | BH-10-45-WC_0-2'  | 0-2             | 40645       | ND                       | --              | ND                               | --              |
| BH-10-46          | BH-10-46-WC_0-2'  | 0-2             | 40645       | ND                       | --              | ND                               | --              |
| BH-10-55          | BH-10-55-WC_0-2'  | 0-2             | 40645       | 0.82                     | 7.55E-07        | 0.29                             | 2.67E-07        |
| BH-10-56          | BH-10-56-WC_0-2'  | 0-2             | 40645       | 1.6                      | 1.47E-06        | 0.52                             | 4.79E-07        |
| BH-10-63          | BH-10-63-WC_0-2'  | 0-2             | 40646       | ND                       | --              | ND                               | --              |
| BH-10-64          | BH-10-64-WC_0-2'  | 0-2             | 40646       | 120                      | 1.10E-04        | 73                               | 6.72E-05        |
| BH-10-69          | BH-10-69-WC_0-2'  | 0-2             | 40645       | ND                       |                 | ND                               | --              |
| BH-10-70          | BH-10-70-WC@0'-2' | 0-2             | 40644       | ND                       | --              | ND                               | --              |
| BH-10-77          | BH-10-77-WC_0-2'  | 0-2             | 40646       | 1.9                      | 1.75E-06        | 0.53                             | 4.88E-07        |
| Cumulative Total: |                   |                 |             | 1.15E-04                 |                 | 6.84E-05                         |                 |

Maximum Total Cumulative Risk for Carcinogens: 1.83E-04 > 1 in 10,000

Notes:  
ND - Not Detected Above Lab Reporting Limit  
(1) All soil samples collected and analyzed were unsaturated.  
(2) All samples are located inside CAMU areas.  
(3) Maximum Total Cumulative Risk is the combined risk of exposure to the detected concentrations of carcinogenic compounds BaP and dibenzo(a,h)anthracene and should be less than 1 in 10,000.