SITE CHARACTERIZATION REPORT
AOI 6

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PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

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1.0 INTRODUCTION

Sunoco Inc. (R&M) (Sunoco) and the Pennsylvania Department of Environmental Protection (PADEP) entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to remedial activities associated with Sunoco's Philadelphia Refinery (Refinery). In accordance with the CO&A, a Current Conditions Report and Comprehensive Remedial Plan (CCR), dated June 30, 2004, was prepared by Sunoco. The CCR proposed Phase II site characterization and corrective action activities for the Refinery, including preparation of Site Characterization Reports for eleven individual Areas of Interest (AOIs). The CCR presented a prioritization of all AOIs based on specific risk factors. In February 2005, the Phase II Corrective Action Activities Schedule (Figure 19 of the CCR) was modified by moving the characterization of AOI 6 ahead of AOI 2 based on potential risk in accordance with discussions with the Pennsylvania Department of Environmental Protection (PADEP). Based on this prioritization, AOI 6 was identified by Sunoco as the third area of the Refinery to be investigated.

Sunoco prepared a Site Characterization Work Plan (Work Plan) for AOI 6 in February 2006 and submitted the plan to the PADEP and United States Environmental Protection Agency (US EPA). This Work Plan summarized proposed activities to be completed to characterize AOI 6 in accordance with the objectives of the CCR. The Work Plan also included proposed activities to characterize the two leaded tank bottom Resource, Conservation and Recovery Act (RCRA) Solid Waste Management Units (SWMUs) in AOI 6.

This Site Characterization Report (SCR) has been prepared exclusively for AOI 6 and documents the results of the activities that were performed for AOI 6 in accordance with the Work Plan. The objective of this SCR is to document current environmental conditions at AOI 6 in accordance with the 2003 CO&A and the 2004 CCR.

1.1 Site History and Background

The Sunoco Philadelphia Refinery is located on approximately 672 acres in southwest Philadelphia. The Facility has a long history of petroleum transportation, storage, and processing. The oldest portion of the Facility started petroleum related activities in the

1860's, when the Atlantic Refining Company established an oil distribution center. In the 1900's, 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 site for a time. Current operations at the refinery are limited to the production of fuels and basic petrochemicals for the chemical industry. Current and historic use figures for AOI 6 are provided as Appendix A.

AOI 6 is comprised of a wedge-shaped section from Lanier Avenue to the Schuylkill River and encompasses approximately 100 acres. The boundary of AOI 6 is shown in Figures 1 and 2. Prior to August 1994, the area currently known as Girard Point (AOI 5 through AOI 7) was owned by Chevron USA, Inc. (Chevron) who purchased the facility from Gulf Oil Company. In 1993, a Remedial Action Plan (RAP) was implemented in response to the September 4, 1992 and January 19, 1993 letters forwarded to Chevron from the Pennsylvania Department of Environmental Resources (PADER) requesting that Chevron address the removal of free-phase hydrocarbon from the water table in "affected areas" of the Facility. The results of this investigation/remedial measures evaluation are presented in Remedial *Action Plan Implementation*, dated September 30, 1993, prepared by Chevron's consultant, Dames & Moore. In addition, Chevron also conducted Remedial Investigation work as part of EPA's corrective action program. Dames & Moore performed an RFI and results of the investigation are presented in a report titled *RCRA Facility Investigation* dated November 23, 1993. The purpose of the RFI was to assess the degree and extent of hazardous waste constituents present and to evaluate whether further investigation was warranted at 10 identified Solid Waste Management Units (SWMUs). Of these 10 areas, two are located in AOI 6 which required further characterization. They include SWMU 92 (Storage Tank Areas: Buried Lead Sludge Area 6) and SWMU 95 (Storage Tank Areas: Buried Lead Sludge Area 9).

The 27 Pump House Total Fluids Recovery System is the only active remediation system located in AOI-6. Installed in November 2001, the system includes 12 active total fluid recovery wells in the vicinity of the former 27 Pump House. This system has the capability of pumping total fluids from wells B-124, B-133, B-134, B-136, B-137, B-138, B-139, B-140, B-142, B-143, B-147 and SUMP-1.

The monitoring program at AOI 6 consists of semi-annual groundwater gauging of all AOI 6 wells and annual groundwater sampling and analysis of six perimeter monitoring wells. The purpose of the well gauging is to identify the presence of LNAPL and determine groundwater flow patterns. The purpose of the annual groundwater sampling event is to evaluate concentration trends at the perimeter of the refinery and compare the results with historical groundwater sampling events.

1.2 Selection of Compounds of Concern and Applicable Standards

The compounds of concern (COCs) for soil and groundwater are listed in Table 1 of this report. These COCs are the same as those listed in the Work Plan and the CCR. The following sections describe the applicable standards that were used in evaluating the Site characterization data.

Soil

Surface (0-2 feet) soil samples were collected at areas that are not covered with materials that prevent direct access in accordance with the Work Plan and screened against the non-residential statewide health medium-specific concentrations (MSCs) for soil (0-2 feet). As summarized in the CCR, where these health MSCs are exceeded, Sunoco will apply either the site-specific pathway elimination option or calculated risk-based site-specific standards.

Groundwater

Groundwater sample results were screened against the non-residential, used-aquifer (TDS<2,500) statewide health groundwater MSCs. As summarized in the CCR, where these statewide health MSCs are exceeded, Sunoco will apply either the site-specific pathway elimination option or calculated risk-based site-specific standards. No calculated risk based numbers were generated for AOI 6 groundwater since the exceedances of the statewide health MSCs will be addressed by engineering controls, natural attenuation and pathway elimination.

1.3 Overview of Investigative Framework and Remedial Approach for AOI 6

The current remediation program for the Refinery is performed under the 2003 CO&A between PADEP and Sunoco and the US EPA RCRA corrective action program. In April 2004, the PADEP and US EPA signed an agreement entitled "One Cleanup Program Memorandum of Agreement (MOA or One-Cleanup Program)," which, among other things, clarifies how sites remediated under Pennsylvania's Act 2 program satisfy RCRA corrective action requirements through characterization and attainment pursuant to Pennsylvania's Act 2. On November 22, 2005, Sunoco and its representatives met with officials of the PADEP and US 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 follow up to the meeting, Sunoco submitted a letter dated December 2, 2005 to US EPA and PADEP memorializing the discussions at the meeting. As summarized in this letter, the major aspects of including the Philadelphia Refinery in the One-Cleanup Program include:

1. Submittal of a Notice of Intent to Remediation (NIR) under the PADEP Act 2 Program. The NIR will specifically reference the 2003 CO&A, the CCR Area of Interest approach to site characterization, and inclusion of corrective action requirements under the PA One-Cleanup Program.

Development and issuance by EPA Region 3 of a revised Corrective Action Permit for the Philadelphia Refinery that embodies the One Cleanup Plan elements.

The PA One-Cleanup Program approach is timely in that AOI 6 is the first AOI to be characterized which contains existing RCRA SWMUs. In development of the Work Plan, Sunoco and Langan reviewed relevant RCRA reports previously prepared for the Girard Point portion of the refinery. A list of the reports reviewed is provided in the Work Plan. Based on this review, two SWMUs were identified in AOI 6 that required further characterization. These are SWMU 92 (Storage Tank Areas: Buried Lead Sludge

Area 6) and SWMU 95 (Storage Tank Areas: Buried Lead Sludge Area 9). These areas were characterized following the investigative approach outlined in Section 1.2.2 of the Work Plan. The investigation activities and results are described in Sections 3.2 and 4.2 of this report.

2.0 ENVIRONMENTAL SETTING

AOI 6 includes the Girard Point Chemicals Processing Area located north of the Penrose Avenue Bridge and south of Pennypacker Avenue. It extends in a wedge-shaped section from Lanier Avenue to the Schuylkill River and encompasses approximately 100 acres. The boundary of AOI 6 is shown in Figures 1 and 2.

2.1 Current and Historic Use

Historically, this area of the refinery consisted of numerous above ground storage tanks (ASTs) containing benzene, toluene, naphtha and other fuel stocks. A sulfuric acid plant was located along the northern boundary of the AOI. A gasoline treating unit, two reformer units, a BDDA (soap) unit, and a thermal hydro-dealkylation unit were also located in this area.

Currently, AOI 6 consists of benzene and cumene units, reformers, tankage, boiler-houses, maintenance buildings, lay-down yards, office buildings, and the Environmental Laboratory. Many ASTs have been removed in recent years. A portion of the refinery's wastewater treatment facility is located in the northwestern corner of the AOI. As shown in Appendix A, approximately 30 percent of AOI 6 is covered by impervious surfaces.

A sheet pile bulkhead, which is keyed into the Middle Clay Unit, extends along the entire western boundary of the AOI, between the AOI and the Schuylkill River. The extent of the wall is shown in Figure 2.

The monitoring well network in AOI 6 includes a total of 65 monitoring wells, three piezometers, and 12 recovery wells. This total includes 14 groundwater monitoring wells that were installed in the fill/alluvium as part of site characterization activities. Well gauging of select wells occurs on a quarterly basis and is complimented by a site-wide gauging event that is performed semi-annually. Sunoco also samples select

perimeter wells in AOI 6 on an annual basis.

2.2 Geology

The following paragraphs describe the geologic units relevant to the refinery and AOI 6 beginning with the deepest units to the shallowest units:

Wissahickon Formation – Bedrock beneath the refinery and AOI 6 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. Historic deep well borings in AOI 6 were completed in the Lower Sand and did not reach bedrock, however, based on interpolation from the numerous geologic cross sections presented in Appendix C of the CCR and the cross section provided as Figure 5, the Wissahickon Schist is expected to be approximately 83 feet beneath the ground surface in AOI 6.

Lower Sand Unit of the PRM - The Wissahickon Formation is overlain by the Lower Sand, which is the lowest member of the Potomac-Raritan Magothy (PRM) Aquifer System. The Lower Sand beneath AOI 6 is a green, brown, orange and/or red, fine gravel and course sand that grades upward into medium-to-fine sands and may contain layers of silts and clay. Throughout AOI 6, the Lower Sand is overlain by the Middle/Lower Clay, as indicated by soil borings B-48D, B-133D, B134D. The boring logs for these wells are included in Appendix D of the CCR. No Lower Sand wells were

installed in AOI 6 as part of the site characterization. Using available geologic cross sections, the Lower Sand is estimated to be approximately 15 to 47 feet thick at AOI 6 as shown in Figure 5.

Middle/Lower Clay – The Lower Sand is overlain by the Middle/Lower Clay unit in AOI 6. The Middle/Lower Clay is characterized by very low permeability reddish-brown, brown or gray clays and sandy clays. Shelby Tube samples were collected in the Middle/Lower Clay in AOI 6 in 1986 by Dames and Moore and in 2001 by URS. The results of the Atterburg limits for both samples classified the Middle/Lower Clay as high plasticity clay. The Middle/Lower Clay is present beneath AOI 6 as a wedge which thickens towards the west and the Schuylkill River. As shown in Figure 5, the clay is approximately 17 feet thick on the east side of AOI 6 and 50 feet thick along its boundary with the River. The western boundary of AOI 6 is bound by a sheet pile wall which is keyed into the clay as shown in Figure 5.

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). Along the Schuylkill River, most of the Pleistocene formations have been eroded away, and based on all deep borings performed to date in AOI 6, the Trenton Gravel in not present throughout AOI 6.

Recent Fill/Alluvium - Overlying the Middle Clay in AOI 6 is recent fill/alluvium. The alluvium deposits generally consist of dark gray organic clayey mud or silt and fine sand. Fill type varies across AOI 6 and includes various sands and gravels, brick and wood fragments, and cinder ash.

As part of the Site characterization activities, 14 fill/alluvium (shallow) groundwater monitoring wells were installed in AOI 6 (Figure 3). The wells were installed to depths of up to 18 feet below grade. Four Lower Sand (deep) groundwater monitoring wells exist in AOI 6. These deep wells are B-48D, B-132D, B-133D and B-134D. No additional deep groundwater monitoring wells were installed in AOI 6 as part of characterization. The CCR includes three geologic cross sections through AOI 6: K-C, J-C and J'-C. A fourth cross section (Q-Q') was generated using the deep well borings in AOI 6. The key for this section is provided as Figure 4 and the section is provided as Figure 5. In summary, based on recent and historical characterization activities, the following observations can be made concerning the geology in AOI 6:

- The Fill/Alluvium, Middle/Lower Clay, and the Lower Sand units all exist beneath AOI 6; the Trenton Gravel is not present;
- The thickness of the Fill/Alluvium materials beneath AOI 6 ranges between 18 to 39 feet;
- The thickness of the Middle/Lower Clay beneath AOI 6 ranges from 17 to 50 feet, and the thickness increases towards the west and the Schuylkill River;
- The thickness of the Lower Sand beneath AOI 6 is approximately 15 to 47 feet.

2.3 Hydrogeology

Groundwater gauging data collected by Secor in May 2006 was used to generate a groundwater flow figure for the Fill/Alluvium (shallow) zone in AOI 6 (Figure 6). This groundwater elevation data is provided in Table 4. Groundwater in the shallow zone of AOI 6 occurs at depths ranging between approximately 1.5 and 16 feet below the ground surface under unconfined conditions. Based on the flow contours in Figure 6, the following observations can be made:

- Flow in the western two-thirds of AOI 6 is influenced by groundwater pumping at the 27 Pump House fluids recovery system. The majority of shallow groundwater in this area is captured by the recovery system.

- Flow in the southwest corner of AOI 6 is towards the south and AOI 5;

- A groundwater flow divide is present in the eastern portion of AOI 6; and

- Flow in the east portion of AOI 6 is towards the northeast and AOI 3.

Four Lower Sand wells are located in AOI 6: B-48D, B-132D, B-133D and B-134D. The lithology for two of these wells, B-48D and B-134D, are illustrated in Figure 5. Groundwater gauging data collected by Secor in May 2006 were used to generate a groundwater flow figure for the Lower Sand (deep) zone in AOI 6 (Figure 7). The groundwater contour scheme in Figure 7 incorporates groundwater elevations from deep wells in AOI 6 and surrounding areas. As shown in Figure 7, groundwater flow in the Lower Sand in AOI 6 is towards the south-southwest. Groundwater elevations in B-48D, B-133D, and B-134 were lower than elevations observed in nearby Fill/Alluvium wells indicating a downward vertical gradient exists between the Fill/Alluvium and the Lower Sand in AOI 6. This is consistent with vertical gradients elsewhere in the refinery.

No aquifer testing was performed in AOI 6 since sufficient data was available from

former aquifer tests (pumping tests and slug tests) performed in AOI 6 by others (SECOR, 2003; URS, 2002). Aquifer testing, consisting of step tests followed by 24-hour constant rate pumping tests, was performed in three wells (B-132, B-134, and B-135) in AOI 6 during April 2001 by URS Corporation. The highest hydraulic conductivity value for these wells was calculated to be 23.98 feet/day.

Based on the available historic aquifer testing data, the highest hydraulic conductivity value calculated from wells in AOI 6 is 23.98 feet/day which is consistent with the value used for the Fill/Alluvium and Trenton Gravel modeling activities performed previously for AOIs 1 and 4.

2.4 Surface Water

No surface water features are located in AOI 6. The nearest surface water body to AOI 6 is the Schuylkill River which comprises the western boundary of AOI 6. A sheet pile wall which is keyed into the Middle Clay exists between AOI 6 and the Schuylkill River as shown in Figure 5.

3.0 SITE CHARACTERIZATION ACTIVITIES

The following sections summarize the Site characterization activities that were completed in AOI 6 in support of this report. All on-site activities were performed between February and August 2006 by Aquaterra Technologies, Inc. (Aquaterra).

3.1 Shallow Soil Borings and Sampling at Non-RCRA SWMU Areas

A total of 19 soil samples were collected for analysis of Site COCs from areas within AOI 6 that are outside SWMU 92 and 95. Of the 19 samples, 11 samples were collected from monitoring well borings and seven samples were collected from hand auger borings near potential source areas (Tank 1010, Unit 1732 and Tank 797). The locations of all soil borings are shown on Figures 3 and 8. Utilizing a stainless steel hand auger, soil borings were advanced to a maximum depth of two feet below grade at each unpaved location in accordance with the Work Plan.

Soil samples were submitted to Lancaster Laboratories, Inc. (LLI) of Lancaster, Pennsylvania for analysis of site COCs. A summary of the soil analytical results is provided as Table 4 and the results are discussed in Section 4.1. The laboratory analytical reports are provided as Appendix C.

3.2 Shallow Soil Borings and Sampling at RCRA SWMU Areas

The 1993 RFI identified two SWMUs, currently in AOI 6, that required further characterization: SWMU 92 (Storage Tank Areas: Buried Lead Sludge Area 6) and SWMU 95 (Storage Tank Areas: Buried Lead Sludge Area 9). These SWMU areas were characterized during this effort following the investigative approach outlined in Section 1.2.2 of the Work Plan and summarized below:

- If materials are encountered within the leaded tank bottom areas matching the physical description of the leaded tank bottoms, then Sunoco will collect samples for total lead;

- If the total lead results exceed 450 parts per million (ppm) (PADEP's non-residential MSC for lead) then the samples will be analyzed for lead via Toxicity Characteristic Leaching Procedure, EPA Test Method 1311;

- Delineated areas that have soils that physically resemble leaded tank bottoms, have lead concentrations greater then 450 ppm, and are hazardous for lead will retain the leaded tank bottom designation. If no soils are encountered that meet all three of these criteria, then the area will no longer be classified as a leaded tank bottom area. Note that none of the soils identified in previous investigations have matched the physical descriptions of the leaded tank bottoms.

To supplement data previous collected as part of the RFI, A total of five borings were completed in SWMU 95 and 16 borings were completed in SWMU 92**.** The locations of the borings are shown on Figures 3 and 9. Utilizing a stainless steel hand auger, soil borings were advanced to a maximum depth of two feet below grade at each location in accordance with the Work Plan. The soils were evaluated to determine if leaded tank bottom materials were present.

Soil samples requiring analysis were submitted to LLI for analysis of total lead concentrations as described in section 1.2.2 of the Work Plan. A summary of the soil analytical results is provided as Table 5 and the results are discussed in Section 4.2. The laboratory analytical reports are provided as Appendix C.

3.3 Installation of Groundwater Monitoring Wells

Well installation activities were performed between February and April 2006 by Aquaterra. Shallow wells were installed to monitor the quality and occurrence of the unconfined, fill/alluvium zone. The well installation activities are discussed in detail in the following sections.

3.3.1 Fill/Alluvium (Shallow) Groundwater Monitoring Wells

Total Quality Drilling, LLC of Mullica Hills, New Jersey installed 14 shallow monitoring wells within the fill/alluvium under the direct supervision of Aquaterra. All wells were installed and constructed in accordance with the Work Plan. Locations of these wells are shown on Figure 3. The fill/alluvium wells were advanced utilizing 8.25-inch inside diameter hollow stem augers and split spoon samplers to record lithology. Split spoon samples were collected at various intervals throughout the borings starting at 8 feet below grade. Monitoring wells were constructed to a maximum depth of 15 feet below grade with the screen intervals ranging from 8 to 13 feet set within the fill/alluvium. Boring logs depicting monitoring well construction details and lithology are provided as Appendix B. Monitoring wells were constructed with a flush mount manhole cover or with three feet of 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.

3.3.2 Lower Sand (Deep) Groundwater Monitoring Wells

Four Lower Sand groundwater monitoring wells exist in AOI 6. These wells include B-48D, B-132D, B-133D and B-134D. No additional deep groundwater monitoring wells were installed in AOI 6.

3.4 Groundwater Monitoring

On May 24, 2006, Secor performed monitoring well gauging activities to collect liquid levels from monitoring wells within AOI 6 as part of the semi-annual refinery well gauging program. Monitoring wells were gauged for depth-to-water, and if applicable, depth-to-product in accordance with the Work Plan. All well gauging readings are

summarized in Table 3.

The groundwater monitoring data from Table 3 was used to generate a shallow groundwater elevation contour map provided as Figure 6. Based on the flow contours in Figure 6, the following observations can be made:

- Flow in the western two-thirds of AOI 6 is influenced by groundwater pumping at the 27 Pump House fluids recovery system, and the majority of shallow groundwater in this area is captured by the recovery system;

- Flow in the southwest corner of AOI 6 is towards the south and AOI 5;

- A groundwater flow divide is present in the eastern portion of AOI 6; and

- Flow in the east portion of AOI 6 is towards the northeast and AOI 3.

Groundwater gauging data from the four Lower Sand wells in Table 3 was used to generate a groundwater flow figure for the Lower Sand (deep) zone in AOI 6 (Figure 7). The groundwater contour scheme in Figure 7 incorporates groundwater elevations from deep wells in AOI 6 and surrounding areas. As shown in Figure 7, groundwater flow in the Lower Sand in AOI 6 is towards the south-southwest. Groundwater elevations in B-48D, B-133D, and B-134 were lower than elevations observed in nearby fill/alluvium wells indicating a downward vertical gradient exists between the fill/alluvium and the Lower Sand in AOI 6.

3.5 Groundwater Sampling

Aquaterra performed a round of groundwater sampling from all accessible wells in AOI 6 between June 6 and June 9, 2006. Wells B-116 and B-162 were sampled on August 10, 2006. All groundwater sampling activities were completed in accordance with the Work Plan. Three well volumes were purged from each well prior to sampling to remove stagnant water from the well and obtain a representative sample. Monitoring

wells were sampled from least-to-most impacted based on historical groundwater analytical data. Well purging was performed by using either a submersible pump with disposable polyethylene tubing or by hand bailing using a disposable bailer. If a submersible pump was used for purging, the pump was decontaminated by rinsing in a distilled water and alconox solution and then rinsing in distilled water. The well sampling data sheet is presented in Appendix D.

Samples were obtained by lowering a disposable bailer slowly into the 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. Once the sample was obtained, 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. A summary of groundwater analytical results for fill/alluvium wells is presented in Tables 6, and Lower Sand wells in Table 7. The laboratory analytical reports are included as Appendix C.

3.6 LNAPL Sampling

LNAPL samples for select wells in AOI 6 were previously characterized as described in the CCR. As part of the recent characterization activities, Aquaterra collected light non-aqueous phase liquid (LNAPL) samples from a total of two existing monitoring wells in AOI 6: B-47 and B-150. LNAPL samples were collected using a direct sampling or swabbing method in accordance with the Work Plan. Samples were packaged in certified hazardous material shipping boxes and sent via FedEx priority overnight to Torkelson Laboratories of Tulsa, Oklahoma for characterization. LNAPL characterization data included product types, density, proportions of product, degree of weathering, and similarities to other samples. Appendix E summarizes the LNAPL characterization results for all samples collected in AOI 6 and previous results from wells in AOI 6.

3.7 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 wells is presented in Table 3.

4.0 SITE CHARACTERIZATION ANALYTICAL RESULTS

The following sections discuss the analytical results of the site characterization activities performed in AOI 6.

4.1 Soil Analytical Results at Non-SWMU Areas

The results of the soil samples collected outside of the RCRA SWMU areas are provided in Table 4. All of the soil samples were collected between one-half foot and two feet below the ground surface and no saturated soils were observed at these depths in any borings. The soil sample results were screened against the PADEP non-residential MSCs for soil. Sample locations and exceedances of the MSCs are shown in Figure 8.

Below is a general summary of the screening results:

- COCs which were detected in soil, exceed their respective non-residential MSCs, and were detected in groundwater include: benzene, toluene, benzo(a)pyrene and total lead;

- Ethylbenzene, ethylene dibromide, 1,2-dichloroethane, total xylenes, MTBE, cumene, anthracene, pyrene, benzo(g,h,i)perylene, benzo(b)fluoranthene, chrysene, benzo(a)anthracene, phenanthrene, flourene and naphthalene were not detected in AOI 6 soil at concentrations exceeding their respective non-residential MSCs.

4.2 Soil Results at SWMU Areas

As stated in Section 1.2.2 of the Work Plan, if materials were encountered within the leaded tank bottom areas during site characterization activities matching the physical description of the leaded tank bottom materials, then samples were collected for total lead. If the total lead results exceeded 450 parts per million (ppm) (the PADEP non-

residential MSC for lead), then the samples were analyzed for lead via Toxicity Characteristic Leaching Procedure (TCLP), EPA Test Method 1311.

No soil boring locations in SWMU 95 exhibited leaded tank bottom materials, therefore no samples were collected for further analysis. The logs for these soil borings are presented in Appendix B. Areas of SWMU 92 had material similar in appearance to leaded tank bottoms, however testing in accordance with the Work Plan demonstrated no detections of leaded tank bottoms, indicating leaded tank bottoms were unlikely to have been disposed of in this area. In SWMU 92, four sample locations (BH-02-06, BH-03-06, BH-13-06, and BH-14-06) exhibited characteristics resembling the physical description of leaded tank bottoms and were sampled accordingly. The results of the sample analyses are summarized in Table 5, illustrated in Figure 9, and the logs for these borings are provided in Appendix B.

A summary of the sample results from these four borings is presented below:

- The sample collected from boring BH-13-06 exhibited a total lead concentration below the PADEP non-residential MSC (450 ppm) and was not submitted for further analysis;

- The samples collected from borings BH-02-06, BH-03-06, and BH-14-06 exceeded the PADEP MSC for total lead. These samples were submitted for analysis of TCLP lead using EPA Method 1311. The lead concentrations for all three samples were below the EPA maximum concentration of lead for toxicity concentration of 5 milligrams per liter (mg/L).

4.3 Groundwater Results

Fill/Alluvium and Lower Sand Wells

The results of the groundwater samples collected from monitoring wells in the fill/alluvium and Lower Sand are provided as Tables 6 and 7, respectively. The results were screened against the non-residential used aquifer (TDS>2,500) groundwater

MSCs; exceedances of the MSCs are illustrated in Figure 10. A general summary of the groundwater screening results is presented below.

Lower Sand Wells

No COC concentrations were detected in groundwater from the four Lower Sand wells in AOI 6.

Fill/Alluvium Wells

A summary of the COC concentrations that exceeded the non-residential groundwater MSCs is below:

- COCs detected in shallow groundwater at concentrations exceeding their respective non-residential MSCs include: benzene, toluene, MTBE, 1,2-dichoroethane, chrysene, naphthalene, and pyrene;

- Cumene, ethylbenzene, ethylene dibromide, xylenes, fluorene, phenanthrene, and lead were not detected in AOI 6 groundwater at concentrations exceeding their respective non-residential MSCs.

4.4 LNAPL Characterization Results

LNAPL characterization results are presented in a summary table in Appendix E. This appendix also includes previous LNAPL characterization data for AOI 6 which was obtained as part of the CCR. The extent of LNAPL types in AOI 6, as well as the apparent thickness of LNAPL measured during Secor's May 2006 gauging event, is illustrated in Figure 11.

As part of the AOI 6 site characterization, Sunoco updated the API LNAPL model for well B-129 by inputting the May 2006 apparent LNAPL thickness of 3.73 feet. The LNAPL model for this well was updated based the well's proximity to the site boundary to the east (approximately 500 feet). The seepage velocity for LNAPL in this well was calculated to be 1.4×10^{-12} cm/sec which is below the mobility threshold of 1×10^{-7} cm/sec referenced in the

CCR. Therefore, LNAPL in this well is considered to be relatively immobile.

Other major conclusions regarding the results of the LNAPL characterization and modeling are discussed below:

- Four different types or mixtures of LNAPL were identified in AOI 6. These include gasoline, middle distillate, middle distillate/residual oil mixture, and residual oil.

- The presence of LNAPL within AOI 6 correlates with the COC concentrations in exceedance of the MSC in the majority of the wells in AOI 6; and

- Wells with the highest LNAPL are located within the 27 Pump House area as discussed in the CCR. All of these wells are located in the area of fluids capture by the remedial pumping at the 27 Pump House area.

5.0 REMEDIAL SYSTEM UPDATE

The 27 Pump House Total Fluids Recovery System is the only active remediation system located in AOI-6. This system includes 12 active total fluid recovery wells in the vicinity of the 27 Pump House. This system has the capability of pumping total fluids from wells B-136, B-137, B-138, B-142, B-143, SUMP-1, B-133, B-134, B-139, B-140, B-147, and B-124. Total fluids produced by each of the wells are routed to an oil/water separator where recovered LNAPL is passively skimmed and deposited into two 550-gallon holding tanks that are piped together. The contents of the holding tanks are pumped out, as necessary, and recycled by the refinery. Groundwater passed through the separator is pumped to the refinery's wastewater treatment plant. Select recovery wells are gauged on a quarterly basis as part of the recovery system performance monitoring program to ensure the system is operating as designed. The system is not winterized and is therefore taken off-line during the winter months. Based on groundwater flow and LNAPL mobility, the known LNAPL plumes in AOI 6 do not have the potential to migrate off-site, including during the winter months when the 27 Pump House recovery system is inoperable.

No additional corrective action activities were completed as a part of this Site Characterization report for AOI 6. The effectiveness of the 27 Pump House Total Fluids system and the need to expand the system to address the southern portion of the gasoline plume shown in Figure 11 are being addressed by Sunoco. Updates and proposed modifications to the system will be provided in the quarterly progress reports prepared for the PADEP.

6.0 FATE AND TRANSPORT ANALYSIS

The following sections describe fate and transport modeling activities performed as part of AOI 6 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. The soil-to-groundwater pathway is evaluated through groundwater data. Potential exposure pathways for AOI 6 are discussed in detail in Section 8.0.

6.2 Groundwater

No fate and transport modeling was completed for the groundwater analytical results since groundwater in AOI 6 is either captured by the pumping system at the 27 Pump House area, or flows towards other AOIs in the refinery. Based on the groundwater flow as depicted in Figure 6, there are no offsite receptors to groundwater from AOI 6. The sheet pile wall along the western boundary of AOI 6 is keyed into the Lower/Middle Clay and acts as a boundary to groundwater flow.

6.3 LNAPL

As described in Appendix E of the CCR, Sunoco evaluated LNAPL mobility across the site using the American Petroleum Institute (API) LNAPL model (Publication Number 4682, "Free-Product Recovery of Petroleum Hydrocarbon Liquids," dated June 1999), as a guide for assessing LNAPL volume, mobility, and recoverability across the refinery. In the CCR, LNAPL in wells WP9-2 and B-124 were identified as having high mobility (greater than $1x10^{-7}$ cm/sec). These wells are associated with the pumping at the 27 Pump House area.

As part of the AOI 6 site characterization, Sunoco updated the API LNAPL model for well

B-129 by inputting the May 2006 apparent LNAPL thickness of 3.73 feet. The LNAPL model for this well was updated based the well's proximity to the site boundary to the east (approximately 500 feet). This substitution resulted in an increase in seepage velocity from 1.4×10^{-13} cm/sec to 1.4×10^{-12} cm/sec, which is below the mobility threshold of 1×10^{-7} cm/sec referenced in the CCR. Based on this mobility value, LNAPL in this area is considered to be relatively immobile.

6.4 VAPOR INTRUSION INTO INDOOR AIR

Occupied areas of AOI 6 are included in an on-site indoor air monitoring program and are regulated under OSHA. Indoor air monitoring was performed by Sunoco on September 8 and 11, 2006 at the Girard Point Main Office Building, the Training Center, the 1332 Control Room, the 1700's Control Room and the 1700's Block House for benzene and total VOC's using an Ultra Rae PID. The Ultra Rae is calibrated for benzene and total VOC's using 5 parts per million benzene calibration gas and 100 parts per million isobutylene calibration gas respectively. The Ultra Rae has a detection limit of 100 parts per billion or 0.1 parts per million for both benzene and total VOC's. Benzene and total VOC's were not detected in any location during the monitoring event. Therefore, no further indoor air evaluation was completed.

The Penrose Avenue sewer is located along the southern boundary of AOI 6. As part of the AOI 6 site characterization, Sunoco evaluated whether the sewer could act as a preferential migration pathway for vapors into the potential receptors. Since shallow groundwater is approximately six feet below the ground surface in the vicinity of the sewer, the sewer is below the water table and therefore does not likely receive vapors from impacted groundwater and/or LNAPL. To investigate whether volatile organic compound vapors were present in the sewer, Sunoco inserted a tube into two sewer manholes in the immediate vicinity of the LNAPL plume and screened the air with a photoionization detector (PID). PID detections ranging from non-detect to 2.9 ppm were observed at high tide. PID detections ranging from 0.2 to 27.1 ppm were observed at low tide.

7.0 SITE CONCEPTUAL MODEL

A preliminary site conceptual model (SCM) for the Refinery was presented in the CCR. Data collected from the Site characterization activities performed in AOI 6 were used to refine the SCM for this area. The SCM for AOI 6 is described below:

7.1 Description and Site Use

AOI 6 is comprised of a wedge-shaped section from Lanier Avenue to the Schuylkill River and encompasses approximately 100 acres. Prior to August 1994, the area was owned by Chevron USA, Inc (Chevron) who purchased the facility from Gulf Oil Company. Existing usage within AOI 6 consists of benzene and cumene units, reformers, tankage, boilerhouses, maintenance buildings, laydown yards, and office buildings, including the Environmental Laboratory. Many ASTs have been removed in recent years. A portion of the Plant's wastewater treatment facility is located in the northwestern corner of the AOI.

7.2 Geology and Hydrogeology

The following summarizes relevant information concerning geology and hydrogeology in AOI 6:

- The Fill/Alluvium, Middle/Lower Clay, and the Lower Sand all exist beneath AOI 6, the Trenton Gravel is absent beneath AOI 6 as shown in Figure 5;

- Unconfined groundwater conditions exist in the fill/alluvium at shallow depths (approximately 1.5 to 16 feet beneath the ground surface);

- The sheet pile wall along the border of AOI 6 and the Schuylkill River is keyed into the Middle/Lower Clay and acts as a boundary for shallow groundwater flow;

- Shallow groundwater flow in the western two-thirds of AOI 6 is influenced by groundwater pumping at the 27-Pump House fluids recovery system. The majority of shallow groundwater in this area is captured by the fluids recovery system. Flow in the southwest corner of AOI 6 is towards the south and AOI 5. A groundwater flow divide is present in the eastern portion of AOI 6, and flow in the east portion of AOI 6 is towards the northeast and AOI 3 as shown in Figure 6;

- Groundwater flow in the Lower Sand in AOI 6 is towards the south-southwest; and

- Vertical groundwater flow between the Fill/Alluvium and the Lower Sand is downward.

7.3 Compounds of Concern

The following summarizes relevant information concerning COCs in AOI 6:

- COCs in soil shallow soil which exceeded their respective non-residential MSCs include: benzene, toluene, benzo(a)pyrene and total lead;

- COCs in shallow groundwater which exceeded their respective non-residential MSCs include: benzene, toluene, chrysene, 1,2-Dichloroethane, naphthalene, pyrene, and MTBE; and

- No COCs were detected in deep groundwater.

The exposure assessment completed for AOI 6 COCs is discussed in Section 8.0 of this report.

7.4 LNAPL Distribution and LNAPL Mobility

The following summarizes relevant information concerning LNAPL distribution in AOI 6:

- Four different types or mixtures of LNAPL were identified in AOI 6. These include gasoline, middle distillate, middle distillate/residual oil mixture, and residual oil.

- The occurrence of LNAPL in AOI 6 correlates with the COC concentrations which exceeded MSCs in groundwater.

- LNAPL in some wells within the 27 Pump House area is considered mobile based on previous LNAPL modeling results as discussed in the CCR. LNAPL elsewhere in AOI 6 is considered to be relatively immobile based on the modeling and does not have the potential to migrate off-site.

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.

No fate and transport modeling was completed for the shallow groundwater analytical results since groundwater in AOI 6 is either captured by the pumping system at the 27 Pump House area or flows towards other AOIs in the refinery. Based on the groundwater flow as depicted in Figure 6, there are no offsite receptors to groundwater from AOI 6. The sheet pile wall along the western boundary of AOI 6 is keyed into the Lower/Middle Clay and acts as a boundary to groundwater flow.

7.6 Potential Migration Pathways and Site Receptors

The following summarizes the relevant information concerning the potential pathways and site receptors for AOI 6.

- AOI 6 is located within a fenced secured area to prevent unauthorized access. Direct contact to site soils is governed by on-site procedures and PPE requirements;

- No human health receptors to groundwater exist for the refinery based on on-site procedures and PPE requirements;

- AOI 6 operates under OSHA regulations with periodic air monitoring, and therefore the potential vapor intrusion into indoor air pathway is being monitored as part of refinery operations. The indoor air at potential vapor receptors in AOI 6 was monitored for benzene and total VOC's by Sunoco; no monitoring results were above the OSHA PELs;

- LNAPL and dissolved COCs in groundwater extend into AOI 5 in the southern portion of AOI 6, however, LNAPL and dissolved COCs in groundwater do not appear to extend off-site.

8.0 HUMAN HEALTH EXPOSURE ASSESSMENT/RISK ASSESSMENT

Based on the current and future intended non-residential site use, an exposure assessment was conducted for all compounds which exceeded the non-residential statewide health standards in AOI 6. Potential human health exposures for the Refinery are for an industrial worker scenario. The media considered included groundwater, surface soil (less than two feet below grade), and subsurface soil (greater than two feet below grade).

Direct contact issues with soil, groundwater and LNAPL for the industrial scenario are addressed 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 6 to assess this potential exposure pathway.

The following table serves as a summary of potential pathways that can be reasonably expected under the current and intended future non-residential use for AOI 6. The table lists potentially contaminated media, potential receptors for these media, and a summary of whether any potential pathways exist at AOI 6 from the media to these receptors.

Potential for Complete Exposure Pathways

Contaminated Media	Residents	Workers	Day Care	Construction	Trespassers	Recreation	Food
Groundwater	Na	No(1)	Na	No (2)	No	Na	Na
Air (indoor)	Na	Yes (4)	Na	No	No	Na	Na
Soil <2 feet bgs.	Na	Yes	Na	No (2)	No	Na	Na
Surface Water	Na	Na	Na	Na	Na	Na	Na
Sediment	Na	Na	Na	Na	Na	Na	Na
LNAPL	Na	No(1)	Na	No (2)	Na	Na	Na

Notes:

(1) No complete groundwater or LNAPL pathways exist for workers that are not addressed through on-site procedures and PPE.

(2) No complete groundwater or LNAPL pathway exists for construction workers due to PPE requirements and Standard Operating Procedures.

(3) No complete pathway exists for site soil > 2 feet deep due to PPE requirements and Standard Operating Procedures.

(4) A potential complete pathway to indoor air exists however Sunoco monitors indoor air under OSHA and therefore this pathway is not considered further.

Na - Not applicable.

No - No potential complete exposure pathway

Yes – Potential complete exposure pathway

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

8.1 Surface Water /Sediment

No surface water features are located in AOI 6. The nearest surface water body to AOI 6 is the Schuylkill River, which comprises the western boundary of AOI 6. A sheet pile wall which is keyed into the Middle Clay exists between AOI 6 and the Schuylkill River as shown in Figure 5. Groundwater interaction with surface water/sediment is limited by the above referenced sheet pile wall. Based on shallow groundwater flow as depicted in Figure 6 and the locations of wells with exceedances of COCs (Figure 10), groundwater exceeding the MSCs either flows away from the sheet pile wall and the river and/or is captured by the total fluids pumping at the 27 Pump House area. Groundwater that is not captured by the pumping at the 27 Pump House area does not contain concentrations of COCs that would result in an exceedance of the PADEP Title 25, Chapter 16 surface water criteria for the Schuylkill River. For these reasons, no groundwater to surface water modeling was performed, and there are no potential surface water receptors and/or exposure pathways in AOI 6.

Sunoco intends to enhance fluids recovery in AOI 6 by installing additional total fluids recovery systems north and south of the 27 Pump House area. With the addition of these pumping systems, it is likely that groundwater along the sheet pile wall will be captured by remedial systems.

8.2 Surface Soils (0-2 Feet Below Grade)

8.2.1 Soil-to-Groundwater

The soil-to-groundwater pathway is being addressed through the groundwater pathway discussed in Section 8.3.

8.2.2 Direct Contact Exposure

Shallow soil samples collected and analyzed as part of the AOI 6 characterization (Tables 4 and 5) exhibited concentrations of benzene, toluene, benzo(a)pyrene and lead above their respective non-residential direct contact MSCs in nine of the 21 soil samples collected (B-154 – B156, B-162, and BH-25-06 – BH-29-06). In accordance with Section IV of the PADEP's Technical Guidance Manual (dated June 8, 2002,) to reduce the list of compounds carried through the risk assessment, the COCs listed above were further screened against the EPA Region III Risk-Based Concentrations (RBCs) for industrial soil. Concentrations of toluene in the shallow soil samples do not exceed the Region III RBC for toluene, therefore, toluene was dropped from the exposure assessment because it is considered to contribute a minimal influence of total risk. The results of the screening and exposure assessment are presented in Appendix F.

For the remaining compounds which exceeded both the PADEP MSCs and the EPA Region III RBCs, site-specific standards were calculated using PADEP default intake parameters for an onsite worker and a risk level of 10^{-4}. For calculating a site-specific standard for onsite workers exposed to lead, Sunoco used the Society of Environmental Geochemistry and Health (SEGH) model used by PADEP to develop the non-residential MSCs.

The risk-based site-specific standards presented in Appendix F for benzene and benzo(a)pyrene was calculated to be 2,152 and 109 mg/kg, respectively. Concentrations of benzene and benzo(a)pyrene detected in the surface soil samples collected in AOI 6 were below these site specific standards and, therefore, risk to an onsite worker due to exposure is considered to be minimal.

The site-specific standard for lead based on the SEGH model presented in Appendix F was calculated to be 1,500 mg/kg. Concentrations of lead detected in the surface soil samples collected in AOI 6 were below this site-specific

standard, with the exception of sample location BH-29-06. At all other soil sample locations, risk to an onsite worker due to exposure is considered minimal. Potential lead exposure within the area of BH-29-06 will be addressed by Sunoco through implementation of a remedy which will eliminate the potential pathway to onsite workers through engineering and institutional controls.

In addition to back calculating the site-specific standards for benzene, benzo(a)pyrene, and lead, the cumulative risk of exposure to benzene and benzo(a)pyrene was also calculated. As discussed in Appendix F, lead is dependent on the blood/lead concentration and is not risk-based; therefore, lead could not be incorporated into the cumulative risk calculation. Cumulative risk, presented in Table F-5, is the combined risk of exposure to the maximum concentrations of benzene and benzo(a)pyrene which, in accordance with the TGM, can not exceed 10^{-4}. The total cumulative risk of exposure to the COCs in AOI 6 was calculated to be 6.27×10^{-5}, an order of magnitude less than PADEP's requirement.

8.3 Groundwater

Benzene, toluene, 1,2-dichloroethane, MTBE, chrysene, pyrene and naphthalene have been detected in shallow groundwater in AOI 6 in exceedance of the non-residential MSCs. Previous investigations (URS, 2002) verified that no wells within 1.5 miles of the refinery are used for drinking water or agricultural use. There are no complete direct contact exposure pathways for groundwater within AOI 6 because of on-site procedures and required PPE. There is no potential direct contact exposure to impacted groundwater due to the depth of groundwater in AOI 6. If, during episodes of high precipitation, groundwater or LNAPL becomes exposed to the ground surface (ponds), then Sunoco will implement additional PPE and site procedures to prevent direct contact by workers to these areas during these episodes.

8.4 LNAPL

There are no complete direct contact exposure pathways for LNAPL within AOI 6 because of on-site procedures and required PPE. Based on the occurrence and mobility of LNAPL in AOI 6, LNAPL does not appear to have migrated off-site.

8.5 Vapor

AOI 6 operates under OSHA regulations with periodic air monitoring, and therefore the potential vapor intrusion into indoor air pathway is being monitored as part of refinery operations. The indoor air at potential vapor receptors in AOI 6 was monitored for benzene and total VOC's by Sunoco; no monitoring results were above the OSHA PELs, therefore, no further assessment was performed.

9.0 ECOLOGICAL ASSESSMENT

The majority of AOI 6 is impervious or covered with gravel (Figure A3 in Appendix A) and the non-covered portions of AOI 6 are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. In 2002, a survey of endangered, threatened and special concern wildlife was conducted by reviewing maps provided at the Pennsylvania Department of Conservation and Natural Resources. No endangered, threatened and special concern wildlife were identified using these maps or during historical investigations. Based on this information, there are no ecological receptors of concern for AOI 6 and no related assessment was necessary.

No surface water features are located in AOI 6. The nearest surface water body to AOI 6 is the Schuylkill River which comprises the western boundary of AOI 6. A sheet pile wall which is keyed into the Middle Clay exists between AOI 6 and the Schuylkill River as shown in Figure 5. Groundwater interaction with surface water/sediment is limited by the above referenced sheet pile wall. As described in Section 8.1, there are no potential surface water receptors and/or exposure pathways in AOI 6.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the completed activities, the following conclusions and recommendations have been developed for AOI 6:

- No leaded tank bottom materials were observed in SWMU 92 (Storage Tank Areas: Buried Lead Sludge Area 6). Therefore Sunoco is requesting a Final Agency Determination for SWMU 92 in AOI 6 from US EPA.

- Leaded tank bottom materials were observed in three soil borings within SWMU 95 (Storage Tank Areas: Buried Lead Sludge Area 9), however, the TCLP results for these samples were below the US EPA maximum concentration of lead for toxicity concentration of 5 mg/L. Therefore Sunoco is requesting a Final Agency Determination for SWMU 95 in AOI 6 from US EPA.

- Soil-to-groundwater and groundwater issues in AOI 6 are addressed through lack of completed pathways. If, during episodes of high precipitation, groundwater or LNAPL becomes exposed to the ground surface, then Sunoco will implement additional site procedures to prevent direct contact by workers to these areas during these episodes.

- Based on the site-specific risk assessment performed for those COCs which exceeded the non-residential MSCs in shallow soil, only lead in the vicinity of BH-29-06 presents an unacceptable risk. At all other soil sample locations, risk to an onsite worker due to exposure is considered acceptable. Potential lead exposure within the area of BH-29-06 will be addressed by Sunoco through implementation of a remedy which will eliminate the potential pathway to onsite workers through use of an engineering control such as stones and an institutional control including signage and on-site procedures.

- Based on the occurrence and mobility of LNAPL in AOI 6, LNAPL does not appear to have migrated off-site. LNAPL in the vicinity of the 27 Pump House area is actively being recovered by a total fluids recovery system, however the southern portion of this LNAPL plume extends into AOI 5 and is not actively being captured by pumping at the 27 Pump

House area. The effectiveness of the 27 Pump House Total Fluids system and the need to expand the system into that area will be evaluated by Sunoco. Although the Tank 797 area appears to be within the capture zone of the 27 Pump House system, additional groundwater recovery efforts will be evaluated in that area. Updates and proposed modifications to the existing remediation system will be provided in the quarterly reports prepared for the refinery.

11.0 REFERENCES

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TABLES

Table 1
Compounds of Concern
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

SOIL	
METALS	**CAS No.**
Lead (total)	7439-92-1
VOLATILE ORGANIC COMPOUNDS	**CAS No.**
1,2-dichloroethane	107-06-2
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
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.

Table 1 (continued)
Compounds of Concern
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

GROUNDWATER	
METALS	**CAS No.**
Lead (dissolved)	7439-92-1
VOLATILE ORGANIC COMPOUNDS	**CAS No.**
1,2-dichloroethane	107-06-2
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.**
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.

Table 2
Existing Well Summary
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery

Well ID	Former Well ID[4]	AOI	Well Type	Well Classification (Shallow, Intermediate, Deep)[5]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction[2]								References
								Well Completion Depth (ft. bgs)	Well Diameter (in)	Casing Elevation (ft. msl) (NAVD88)	Ground Surface Elevation[1] (ft.) (NAVD88)	Top of Screen Elevation (ft) (NAVD88)	Bottom of Screen Elevation (ft) (NAVD88)	Depth to Screen (ft. bgs)	Screen Length (ft.)	
B-115	--	6	Monitoring Well	Shallow	--	--	--	--	--	8.01	5.07	--	--	--	--	Handex, 1996
B-116	--	6	Monitoring Well	Shallow	--	--	--	--	--	6.33	6.33	--	--	--	--	Handex, 1996
B-117	--	6	Monitoring Well	Shallow	--	--	--	--	--	8.32	8.32	--	--	--	--	Handex, 1996
B-123	--	6	Monitoring Well	Shallow	--	--	--	--	--	--	12.10	--	--	--	--	Handex, 1996
B-124	--	6	Recovery Well	Shallow	Y	Y	9/21/92	15	4	11.61	10.56	5.56	-4.44	5	10	Handex, 1996
B-125	--	6	Monitoring Well	Shallow	--	--	--	--	--	--	10.09	--	--	--	--	Handex, 1996
B-126	--	6	Monitoring Well	Shallow	--	--	--	--	--	--	10.15	--	--	--	--	Handex, 1996
B-129	--	6	Monitoring Well	Shallow	Y	Y	8/20/92	15	4	8.04	9.95	4.95	-5.05	5	10	Dames & Moore, 1992
B-130	--	6	Monitoring Well	Shallow	Y	Y	8/20/92	16	4	--	11.48	6.48	-3.52	5	10	Dames & Moore, 1992
B-131	--	6	Monitoring Well	Shallow	Y	Y	8/20/92	14	4	--	10.32	6.32	-3.68	4	10	Dames & Moore, 1992
B-132	--	6	Monitoring Well	Shallow	Y	Y	8/28/01	11	4	--	4.01	3.01	-6.99	1	10	URS, 2002
B-132D	--	6	Monitoring Well	Deep	Y	Y	3/7/01	85	2	10.55	8.12	-66.88	-76.88	75	10	URS, 2002
B-133	--	6	Recovery Well	Shallow	Y	Y	8/28/01	11	--	--	4.58	3.58	-6.42	1	10	URS, 2002
B-133D	--	6	Monitoring Well	Deep	Y	Y	3/5/01	65	2	10.03	--	--	--	55	10	URS, 2002
B-134	--	6	Recovery Well	Shallow	Y	Y	8/28/01	11	--	--	4.71	3.71	-6.29	1	10	URS, 2002
B-134D	--	6	Monitoring Well	Deep	Y	Y	3/5/01	79	2	9.73	--	--	--	69	10	URS, 2002
B-135	--	6	Monitoring Well	Shallow	Y	Y	8/28/01	11	--	--	4.39	3.39	-6.61	1	10	URS, 2002
B-136	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	7.55	5.55	-4.45	2	10	URS, 2002
B-137	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	7.37	5.37	-4.63	2	10	Handex, 1996
B-138	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	7.32	5.32	-4.68	2	10	Handex, 1996
B-139	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	8.01	6.01	-3.99	2	10	Handex, 1996
B-140	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	8.38	6.38	-3.62	2	10	Handex, 1996
B-141	--	6	Monitoring Well	Shallow	Y	Y	8/30/01	12	--	--	11.38	9.38	-0.62	2	10	Handex, 1996
B-142	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	8.04	6.04	-3.96	2	10	Handex, 1996
B-143	--	6	Recovery Well	Shallow	Y	Y	8/29/01	12	--	--	7.56	5.56	-4.44	2	10	Handex, 1996
B-144	--	6	Monitoring Well	Shallow	Y	Y	8/30/01	12	--	--	7.23	5.23	-4.77	2	10	Handex, 1996
B-145	--	6	Monitoring Well	Shallow	Y	Y	8/30/01	12	--	--	8.22	6.22	-3.78	2	10	Handex, 1996
B-146	--	6	Monitoring Well	Shallow	Y	Y	8/30/01	12	--	--	9.19	7.19	-2.81	2	10	Handex, 1996
B-147	--	6	Recovery Well	Shallow	Y	Y	8/30/01	12	--	5.20	7.75	5.75	-4.25	2	10	Handex, 1996
B-148	MW-1	6	Monitoring Well	Shallow	Y	N	9/17/02	11	--	7.23	5.19	4.19	-5.81	1	10	Secor, 2002
B-149	MW-2	6	Monitoring Well	Shallow	Y	Y	9/17/02	11	--	--	0.00	-1	-11	1	10	Secor, 2002
B-150	MW-3	6	Monitoring Well	Shallow	Y	Y	9/16/02	11	--	--	0.00	-1	-11	1	10	Secor, 2002
B-151	--	6	Monitoring Well	Shallow	Y	Y	2/23/06	13	4	7.74	5.77	3.77	-4.23	2	8	Aquaterra, 2006
B-152	--	6	Monitoring Well	Shallow	Y	Y	2/27/06	10	4	5.04	5.50	3.5	-4.5	2	8	Aquaterra, 2006
B-153	--	6	Monitoring Well	Shallow	Y	Y	2/24/06	10	4	6.37	6.67	4.67	-3.33	2	8	Aquaterra, 2006
B-154	--	6	Monitoring Well	Shallow	Y	Y	2/23/06	13	4	8.68	6.43	4.43	-3.57	2	8	Aquaterra, 2006
B-155	--	6	Monitoring Well	Shallow	Y	Y	2/24/06	13	4	8.54	6.54	4.54	-3.46	2	8	Aquaterra, 2006
B-156	--	6	Monitoring Well	Shallow	Y	Y	2/23/06	13	4	8.86	6.66	4.66	-3.34	2	8	Aquaterra, 2006
B-157	--	6	Monitoring Well	Shallow	Y	Y	2/22/06	12	4	4.92	5.26	3.26	-6.74	2	10	Aquaterra, 2006
B-158	--	6	Monitoring Well	Shallow	Y	Y	2/22/06	12	4	8.21	8.66	6.66	-3.34	2	10	Aquaterra, 2006
B-159	--	6	Monitoring Well	Shallow	Y	Y	4/20/06	10	4	8.12	8.51	6.51	-1.49	2	8	Aquaterra, 2006
B-160	--	6	Monitoring Well	Shallow	Y	Y	2/27/06	10	4	8.53	8.95	6.95	-1.05	2	8	Aquaterra, 2006
B-161	--	6	Monitoring Well	Shallow	Y	Y	2/21/06	15	4	10.00	6.98	4.98	-5.02	2	10	Aquaterra, 2006
B-162	--	6	Monitoring Well	Shallow	Y	Y	2/20/06	18	4	7.59	4.93	2.93	-10.07	2	13	Aquaterra, 2006
B-163	--	6	Monitoring Well	Shallow	Y	Y	2/28/06	10	4	7.45	7.68	5.68	-2.32	2	8	Aquaterra, 2006
B-164	--	6	Monitoring Well	Shallow	Y	Y	2/21/06	15	4	8.82	5.86	3.86	-6.14	2	10	Aquaterra, 2006
B-39	--	6	Monitoring Well	Shallow	Y	Y	2/19/86	15	4	8.73	7.68	4.68	-7.32	3	12	Dames & Moore, 1990
B-40	--	6	Abandoned	Shallow	Y	Y	2/18/86	13	4	7.17	6.12	3.12	-6.88	3	10	Dames & Moore, 1990
B-41	--	6	Abandoned	Shallow	Y	Y	2/21/86	12	4	8.85	7.80	5.8	-4.2	2	10	Dames & Moore, 1990
B-42	--	6	Monitoring Well	Shallow	Y	Y	2/19/86	15	4	8.04	6.99	4.49	-8.01	2.5	12.5	Dames & Moore, 1990
B-43	--	6	Monitoring Well	Shallow	Y	Y	2/19/86	14.5	4	9.36	8.31	5.31	-6.19	3	11.5	Dames & Moore, 1990
B-44	--	6	Abandoned	Shallow	Y	Y	2/20/86	15	4	8.21	7.16	4.16	-5.84	3	10	Dames & Moore, 1990
B-45	--	6	Monitoring Well	Shallow	Y	Y	2/20/86	15	4	7.30	6.25	3.25	-8.75	3	12	Dames & Moore, 1990
B-46	--	6	Monitoring Well	Shallow	Y	Y	2/21/86	12	4	10.56	9.50	7.5	-2.5	2	10	Dames & Moore, 1990
B-47	--	6	Monitoring Well	Shallow	Y	Y	2/21/86	13	4	10.56	9.51	6.51	-3.49	3	10	Dames & Moore, 1990
B-48	--	6	Monitoring Well	Shallow	Y	Y	2/21/86	14	4	8.90	7.85	3.85	-6.15	4	10	Dames & Moore, 1990
B-48D	--	6	Monitoring Well	Deep	Y	Y	11/6/86	55	4	9.82	8.77	-36.23	-46.23	45	10	Dames & Moore, 1990
B-92	--	6	Monitoring Well	Shallow	Y	Y	10/21/86	15.5	4	12.33	11.28	5.78	-4.22	5.5	10	Dames & Moore, 1990
B-93	--	6	Abandoned	Shallow	Y	Y	10/22/86	13.5	4	12.83	11.67	8.17	-1.83	3.5	10	Dames & Moore, 1990
B-94	--	6	Monitoring Well	Shallow	Y	Y	10/22/86	14	4	11.21	8.45	4.45	-5.55	4	10	Dames & Moore, 1990
GP-19	--	6	Abandoned	Shallow	Y	Y	9/11/00	15	--	7.80	--	--	--	5	10	URS, 2002
GP-22	--	6	Abandoned	Shallow	Y	Y	9/11/00	15	--	7.50	--	--	--	10	5	URS, 2002
GP-3	--	6	Abandoned	Shallow	Y	Y	9/8/00	14	--	7.60	--	--	--	4	9	URS, 2002
PH-36	--	6	Abandoned	--	--	--	--	--	--	--	--	--	--	--	--	USGS, 1989
PH-37	--	6	Abandoned	--	--	--	--	--	--	--	--	--	--	--	--	USGS, 1989
PH-39	--	6	Abandoned	--	--	--	--	--	--	--	--	--	--	--	--	USGS, 1989
PH-42	--	6	Abandoned	--	--	--	--	--	--	--	--	--	--	--	--	USGS, 1989

-- Data could not be located or determined based on available reports

Abandoned wells.

NOTES:

AOI - Area of Interest
ft. - feet
bgs - below ground surface
in. - inches
msl - elevation relative to mean sea level

1. TIC and all other relevant elevation datum for wells within AOI 6 were resurveyed by Langan duirng the completion of the AOI 6 Site Characterization Report. This was done to update all wells to the NAVD 88 datum.
2. Well construction details were taken directly from well boring logs provided by Handex or collected from available historic reports. Where no well boring logs exist, no well construction or lithologic data exists
3. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.
4. Well classification was chosen based on the formation in which the well was screened. 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 were classified as either a shallow or intermediate well.

Table 2
Existing Well Summary
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery

Well ID	Former Well ID[4]	AOI	Well Type	Well Classification (Shallow, Intermediate, Deep)[5]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction[2]								References
								Well Completion Depth (ft. bgs)	Well Diameter (in)	Casing Elevation (ft. msl) (NAVD88)	Ground Surface Elevation[1] (ft.) (NAVD88)	Top of Screen Elevation (ft) (NAVD88)	Bottom of Screen Elevation (ft) (NAVD88)	Depth to Screen (ft. bgs)	Screen Length (ft.)	
PS-1	--	6	Monitoring Well	--												
PZ-132A	--	6	Piezometer	Shallow	Y	Y	3/8/01	10	1	--	--	--	--	5	5	URS, 2002
PZ-132B	--	6	Abandoned	Shallow	Y	Y	3/8/01	10	1	--	--	--	--	5	5	URS, 2002
PZ-134A	--	6	Abandoned	Shallow	Y	Y	3/8/01	10	1	--	--	--	--	5	5	URS, 2002
PZ-134B	--	6	Abandoned	Shallow	Y	Y	3/8/01	10	1	--	--	--	--	5	5	URS, 2002
PZ-135A	--	6	Piezometer	Shallow	Y	Y	3/8/01	10	1	--	8.22	3.22	-1.78	5	5	URS, 2002
PZ-135B	--	6	Piezometer	Shallow	Y	Y	3/8/01	10	1	--	--	--	--	5	5	URS, 2002
RW16-2	--	6	Abandoned	--												
RW-9	--	6	Recovery Well	--	Y	Y	--	--	--	--	10.29	--	--	--	--	Handex, 1996
SUMP-1	--	6	Recovery Well	Shallow	Y	Y	11/1/01	10	6	--	10.15	10.15	0.15	0	10	Handex, 1996
U-1	--	6	Monitoring Well	-	N	N	--	--	--	--	--	--	--	--	--	
U-2	--	6	Monitoring Well	-	N	N	--	--	--	--	--	--	--	--	--	
U-3	--	6	Monitoring Well	-	N	N	--	--	--	--	--	--	--	--	--	
U-4	--	6	Monitoring Well	-	N	N	--	--	--	--	--	--	--	--	--	
U-5	--	6	Monitoring Well	-	N	N	--	--	--	--	--	--	--	--	--	
URS-1	B-132U	6	Monitoring Well	Shallow	N	N	--		--	--	9.05	--	--	--	--	
URS-2	B-133U	6	Monitoring Well	Shallow	N	N	--		--	--	--	--	--	--	--	
URS-3	B-134U	6	Monitoring Well	Shallow	N	N	--	18	--	--	--	--	--	--	--	
URS-4	B-135U	6	Monitoring Well	Shallow	N	N	--		--	9.94	8.56	--	--	--	--	
URS-5	B-136U	6	Monitoring Well	Shallow	N	N	--	14	--	--	--	--	--	--	--	
WP10-1	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP10-2	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-1	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-10	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-11	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-12	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-2	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-3	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-4	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-5	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-6	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-7	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-8	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP11-9	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP12-1	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP12-2	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP12-3	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP12-4	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP12-5	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP16-1	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP16-2	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	13.59	--	--	0.5	10	Handex, 1996
WP16-3	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP16-4	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP16-5		6	Monitoring Well	Shallow	Y	Y	6/21/93	10.5	2	--	13.71	--	--	0.5	10	Handex, 1996
WP17-1	--	6	Abandoned	--	Y	Y	34131	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP17-2	--	6	Abandoned	--	Y	Y	34131	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP17-3	--	6	Abandoned	--	Y	Y	34131	10.5	--	--	--	--	--	0.5	10	Handex, 1996
WP8-1	--	6	Abandoned	--	Y	Y	34114	10.5	--	--	--	--	--	0.5	10	Dames & Moore Boring Log
WP8-2	--	6	Abandoned	--	Y	Y	34114	10.5	--	--	--	--	--	0.5	10	Dames & Moore Boring Log
WP8-3	--	6	Abandoned	--	Y	Y	34114	10.5	--	--	--	--	--	0.5	10	Dames & Moore Boring Log
WP9-1	--	6	Abandoned	Shallow	Y	Y	34115	9	--	--	7.9	7.40	-2.10	0.5	9.5	Handex, 1996
WP9-2	--	6	Monitoring Well	Shallow	Y	Y	5/26/93	10.5	--	--	8.15	7.65	-2.35	0.5	10	Handex, 1996
WP9-3	--	6	Monitoring Well	Shallow	Y	Y	5/26/93	9	--	--	7.23	6.73	-2.77	0.5	9.5	Handex, 1996
WP9-4	--	6	Monitoring Well	Shallow	Y	Y	6/14/93	9	--	--	10.23	9.73	0.23	0.5	9.5	Handex, 1996
WP9-5	--	6	Abandoned	--	Y	Y	6/14/93	10.5	--	--	-1.05	-1.55	-11.55	0.5	10	Handex, 1996
WP9-6	--	6	Abandoned	--	Y	Y	6/11/93	10.5	--	--	10.02	9.52	-0.48	0.5	10	Handex, 1996
WP9-7	--	6	Abandoned	--	N	N	--	--	--	--	--	--	--	--	--	
WP9-8	--	6	Monitoring Well	--	N	N	--	--	--	8.82	6.35	--	--	--	--	
WPM-1	--	6	Abandoned	--	--	--	--	--	--	--	13.80	--	--	--	--	Handex, 1996
WPM-10	--	6	Abandoned	--	--	--	--	--	--	--	9.99	--	--	--	--	Handex, 1996
WPM-11	--	6	RFI Well Point Loc.	--	--	--	--	--	--	--	13.60	--	--	--	--	Handex, 1996
WPM-2	--	6	Abandoned	--	--	--	--	--	--	--	13.97	--	--	--	--	Handex, 1996
WPM-3	--	6	Abandoned	--	--	--	--	--	--	--	13.76	--	--	--	--	Handex, 1996
WPM-4	--	6	Abandoned	--	--	--	--	--	--	14.06	13.01	--	--	--	--	Dames & Moore, 1993
WPM-5	--	6	Abandoned	--	--	--	--	--	--	14.18	13.13	--	--	--	--	Dames & Moore, 1993
WPM-6	--	6	Abandoned	--	--	--	--	--	--	--	--	--	--	--	--	Dames & Moore, 1993
WPM-6	--	6	Abandoned	--	--	--	--	--	--	14.35	13.30	--	--	--	--	Dames & Moore, 1993
WPM-7	--	6	Abandoned	--	--	--	--	--	--	--	14.68	--	--	--	--	Handex, 1996
WPM-8	RWM-8	6	Monitoring Well	--	--	--	--	--	--	14.99	13.94	--	--	--	--	Dames & Moore, 1993
WPM-9	--	6	Abandoned	--	--	--	--	--	--	16.50	15.45	--	--	--	--	Dames & Moore, 1993

-- Data could not be located or determined based on available reports

Abandoned wells.

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1. TIC and all other relevant elevation datum for wells within AOI 6 were resurveyed by Langan during the completion of the AOI 6 Site Characterization Report. This was done to update all wells to the NAVD 88 datum.
2. Well construction details were taken directly from well boring logs provided by Handex or collected from available historic reports. Where no well boring logs exist, no well construction or lithologic data exists
3. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.
4. Well classification was chosen based on the formation in which the well was screened. 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 were classified as either a shallow or intermediate well.

Table 3
Summary of AOI 6 Groundwater and LNAPL Elevations
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

Monitoring Point ID	AOI	Specific Gravity (g/cc)		Notes	Total Well Depth	Depth to Product	Depth to Water[3] (ft)	LNAPL Thickness[3] (ft)	LNAPL Elevation[3] (ft amsl)	GW Elevation[3,4] (ft amsl)	Corrected GW Elevation (ft amsl)
		S.G.[1]	Source[2]								
AOI 6											
B-115	AOI 6				18	NP	3.27	0	NA	4.23	4.23
B-116	AOI 6				18	NP	5.82	0	NA	2.21	2.21
B-117	AOI 6				18	NP	7.13	0	NA	2.42	2.42
B-123	AOI 6				18	NP	5.24	0	NA	5.06	5.06
B-124	AOI 6	0.8114	WP9-2		18	5.05	6.43	1.38	3.92	2.54	3.66
B-125	AOI 6				18	NP	4.94	0	NA	3.58	3.58
B-126	AOI 6				20	NP	5.12	0	NA	3.39	3.39
B-129	AOI 6	0.8654	B-129		16	5.18	8.91	3.73	2.85	-0.88	2.34
B-130	AOI 6	0.9306	B-130		16	4.62	5.28	0.66	5.08	4.42	5.03
B-131	AOI 6				14	NP	5.60	0	NA	3.12	3.12
B-132	AOI 6	0.8654	B-129		14	4.85	5.06	0.21	2.02	1.81	1.99
B-132D	AOI 6				85	NP	16.13	0	NA	-5.82	-5.82
B-133	AOI 6	0.8114	WP9-2	F	14	5.19	5.20	0.01	2.15	2.14	2.14
B-133D	AOI 6				65	NP	11.55	0	NA	-2.94	-2.94
B-134	AOI 6	0.8654	B-129		14	4.64	4.86	0.22	2.89	2.67	2.86
B-134D	AOI 6				79	NP	12.67	0	NA	-4.50	-4.50
B-135	AOI 6	0.8654	B-129		14	4.43	5.12	0.69	1.75	1.06	1.66
B-136	AOI 6	0.8654	B-129		14	5.92	5.95	0.03	3.23	3.20	3.23
B-137	AOI 6				14	NP	9.65	0	NA	-0.91	-0.91
B-138	AOI 6	0.8114	WP9-2	Measured from Top of Pump	14	3.95	9.20	5.25	5.39	0.14	4.40
B-139	AOI 6			Measured from Top of Pump	14	NP	9.65	0	NA	-0.25	-0.25
B-140	AOI 6	0.8654	B-129		14	5.8	6.06	0.26	4.34	4.08	4.31
B-141	AOI 6	0.8654	B-129		14	3.68	4.43	0.75	5.02	4.27	4.92
B-142	AOI 6			Measured from Top of Pump	14	NP	8.90	0	NA	0.84	0.84
B-143	AOI 6			Measured from Top of Pump	14	NP	9.30	0	NA	-0.31	-0.31
B-144	AOI 6	0.8654	B-144		14	5.33	5.45	0.12	3.70	3.58	3.68
B-145	AOI 6				14	NP	4.78	0	NA	5.04	5.04
B-146	AOI 6	0.8654	B-144		14	NP	NM	NA	NA	NA	NA
B-147	AOI 6	0.8654	B-144		14	6.22	6.85	0.25	2.69	2.06	2.28
B-148	AOI 6	0.8654	B-144		14	4.88	6.79	1.91	NA	NA	NA
B-149	AOI 6				14	NP	3.15	0	NA	4.59	4.59
B-150	AOI 6	0.8654	B-144		14	3.04	4.30	1.26	4.77	3.51	4.60
B-151	AOI 6				10	NP	3.44	0	NA	4.30	4.30
B-152	AOI 6				10	NP	1.29	0	NA	3.75	3.75
B-153	AOI 6				10	NP	1.59	0	NA	4.78	4.78
B-154	AOI 6				10	NP	4.17	0	NA	4.51	4.51
B-155	AOI 6				10	NP	4.96	0	NA	3.58	3.58
B-156	AOI 6				10	NP	5.14	0	NA	3.72	3.72
B-157	AOI 6				12	NP	1.75	0	NA	3.17	3.17
B-158	AOI 6				12	NP	2.93	0	NA	5.28	5.28
B-159	AOI 6				10	NM	NM	NA	NA	NA	NA
B-160	AOI 6				10	NP	3.50	0	NA	5.03	5.03
B-161	AOI 6	0.8114	WP9-2	F	15	6.31	6.32	0.01	3.69	3.68	3.69
B-162	AOI 6				18	NP	3.31	0	NA	4.28	4.28
B-163	AOI 6				10	NP	2.76	0	NA	4.69	4.69
B-164	AOI 6				12	NP	5.61	0	NA	3.21	3.21
B-39	AOI 6	0.8734	B-39	F	15	2.24	2.25	0.01	3.24	3.23	3.24
B-43	AOI 6	0.9161	B-43		14.5	1.47	1.97	0.50	5.75	5.25	5.71
B-45	AOI 6				15	NP	1.80	0	NA	3.30	3.30
B-46	AOI 6				15	NP	1.43	0	NA	6.60	6.60
B-47	AOI 6	0.8654	B-144	F	15	3.5	3.51	0.01	4.80	4.79	4.79
B-48	AOI 6				14	NP	0.49	0	NA	6.09	6.09
B-48D	AOI 6				55	NP	12.07	0	NA	-2.65	-2.65
B-92	AOI 6				15.5	NP	5.40	0	NA	4.83	4.83
B-94	AOI 6				14	NP	6.54	0	NA	3.82	3.82
PS-1	AOI 6				NA	NM	NM	NA	NA	NA	NA
PZ-132A	AOI 6				NA	NM	NM	NA	NA	NA	NA
PZ-135A	AOI 6				NA	NM	NM	NA	NA	NA	NA
PZ-135B	AOI 6				NA	NM	NM	NA	NA	NA	NA
RW-9	AOI 6	0.8114	WP9-2		NA	5.05	5.86	0.81	3.72	2.91	3.56
RWM-8	AOI 6			No Survey & Same as WMP-8?	NA	NP	8.30	0	NA	4.32	4.32
RW-16-2	AOI 6				NA	NM	NM	NA	NA	NA	NA
SUMP-1	AOI 6				15	6.51	6.52	0.01	3.64	3.63	3.63
U-1	AOI 6	0.8114	WP9-2		NA	NP	7.64	0	NA	3.06	3.06
U-2	AOI 6				NA	NP	6.42	0	NA	2.88	2.88
U-3	AOI 6	0.8114	WP9-2		NA	6.72	7.13	0.41	3.08	2.67	3.00
U-4	AOI 6				NA	NP	3.71	0	NA	5.51	5.51
U-5	AOI 6				NA	NP	6.73	0	NA	3.06	3.06
URS-1	AOI 6				NA	NP	6.07	0	NA	3.93	3.93
URS-2	AOI 6				NA	NP	4.69	0	NA	3.21	3.21
URS-3	AOI 6				18	NP	4.18	0	NA	3.43	3.43
URS-4	AOI 6				NA	NP	7.35	0	NA	2.59	2.59
URS-5	AOI 6				14	NP	5.37	0	NA	2.57	2.57
WP16-5	AOI 6				10.5	NP	6.65	0	NA	6.92	6.92
WP9-2	AOI 6	0.8114	WP9-2		10.5	1.99	4.17	2.18	4.03	1.85	3.62
WP9-3	AOI 6				10.5	NP	2.66	0	NA	3.51	3.51
WP9-4	AOI 6	0.8114	WP9-2	F	10.5	5.69	5.70	0.01	3.19	3.18	3.18
WP-9-8	AOI 6	0.8114	WP9-2		NA	5.12	5.65	0.53	1.21	0.68	1.11
WPM-11	AOI 6			No survey	NA	NP	1.29	0	NA	5.71	5.71
WPM-2	AOI 6			No survey & reported damaged by Aquaterra	NA	NP	7.84	0	NA	-7.84	-7.84
WPM-3	AOI 6			No survey & reported damaged by Aquaterra	NA	NP	7.78	0	NA	-7.78	-7.78
WPM-5	AOI 6			No survey & reported damaged by Aquaterra	NA	NP	6.01	0	NA	-6.01	-6.01
WPM-8	AOI 6			No Survey & Same as RWM-8?	NA	NP	8.30	0	NA	4.32	4.32

Notes:
1. Specific Gravity (S.G.) values were determined from LNAPL samples taken by Aquaterra on February 27th and March 1st, 2004, April 12, 2006 (analysis pending), or from samples collected by SECOR in 1999-2000.
2. For wells with no direct S.G. measurements, the S.G. value in the nearest well with a direct S.G was used.
3. Depth to Water and Depth to LNAPL provided by Secor May 2006.
4. Active Recovery Well.

AOI = Area of Interest
g/cc = grams per cubic centimeter
LNAPL = Light Non-Aqueous Phase Liquid
ft amsl = feet above mean sea level
GW = Groundwater
F = Film or trace product
NA = Not Applicable
NM = Not Measured
NP = No Product

Table 4
Summary of Soil Sample Analytical Results: Non SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs	Location ID	B-151			B-152			B-153			B-154			B-155			B-156			B-157		
			Sample ID	BH-B151-030106-0.5-1			BH-B152-030106-1.5-2			BH-B153-030106-1.5-2			BH-B154-030106-1-1.5			BH-B155-032006-1.5-2			BH-B156-032006-1-1.5			BH-B157-030106-1-1.5		
		0-2' Dry	Sample Matrix	Soil			Soil			Soil			Soil			Soil			Soil			Soil		
			Sample Interval	0.5-1.0			1.5-2.0			1.5-2.0			1.0-1.5			1.5-2.0			1.5-2.0			1.0-1.5		
			Sample Date	3/1/2006			3/1/2006			3/1/2006			3/1/2006			3/20/2006			3/20/2006			3/1/2006		
Volatile Organic Compounds			Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	70000	ug/kg	ND	U	200	240		200	ND	U	420	1800		160	ND	U	220	ND	U	5	ND	U	240
Ethylene dibromide (EDB)	106-93-4	5	ug/kg	ND	U	200	ND	U	200	ND	U	420	ND	U	160	ND	U	220	ND	U	5	ND	U	240
1,2-Dichloroethane	107-06-2	500	ug/kg	ND	U	200	ND	U	200	ND	U	420	ND	U	160	ND	U	220	ND	U	5	ND	U	240
Toluene	108-88-3	100000	ug/kg	ND	U	200	ND	U	200	ND	U	420	240		160	ND	U	220	6		5	ND	U	240
Xylene (Total)	1330-20-7	1000000	ug/kg	ND	U	200	ND	U	200	ND	U	420	1200		160	ND	U	220	7		5	270		240
Methyl Tertiary Butyl Ether	1634-04-4	2000	ug/kg	ND	U	200	ND	U	200	ND	U	420	ND	U	160	ND	U	220	ND	U	5	ND	U	240
Benzene	71-43-2	500	ug/kg	ND	U	200	460		200	ND	U	420	3600		160	ND	U	220	9		5	ND	U	240
Cumene	98-82-8	1600000	ug/kg	ND	U	200	20000		2000	ND	U	420	1800		160	ND	U	220	7		5	ND	U	240
Semi Volatile Organic Compounds																								
Anthracene	120-12-7	350000	ug/kg	ND	U	920	ND	U	3000	ND	U	280	6200		5800	750		230	860		210	ND	U	1100
Pyrene	129-00-0	2200000	ug/kg	5300		920	ND	U	3000	ND	U	280	15000		5800	2300		230	2500		210	1400		1100
Benzo(g,h,i)perylene	191-24-2	180000	ug/kg	ND	U	920	ND	U	3000	ND	U	280	ND	U	5800	310		230	420		210	ND	U	1100
Benzo(b)fluoranthene	205-99-2	110000	ug/kg	1600		920	ND	U	3000	ND	U	280	ND	U	5800	1100		230	1100		210	2100		1100
Chrysene	218-01-9	230000	ug/kg	2400		920	ND	U	3000	ND	U	280	7800		5800	820		230	920		210	1400		1100
Benzo(a)pyrene	50-32-8	11000	ug/kg	1700		920	ND	U	3000	ND	U	280	ND	U	5800	780		230	820		210	1500		1100
Benzo(a)anthracene	56-55-3	110000	ug/kg	2000		920	ND	U	3000	ND	U	280	5900		5800	840		230	830		210	1400		1100
Phenanthrene	85-01-8	10000000	ug/kg	2900		920	ND	U	3000	ND	U	280	31000		5800	3000		230	4300		210	ND	U	1100
Fluorene	86-73-7	3800000	ug/kg	1100		920	ND	U	3000	4200		280	7800		5800	1100		230	1900		210	ND	U	1100
Naphthalene	91-20-3	25000	ug/kg	8600		920	ND	U	3000	ND	U	280	6800		5800	700		230	370		210	ND	U	1100
Metals																								
Lead (Total)	7439-92-1	450	mg/kg	198		10.6	27		2.32	66.3		3.38	410		2.29	618		2.7	1070		2.56	178		2.55

Notes:
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ug/kg - microgram per kilogram
mg/kg - milligram per kilogram
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RL - Reporting Limit
ND - Not Detected
NA - Not Analyzed
(1) All soil samples collected and analyzed were unsaturated.
(2) BH-20-06, BH-21-06, B-161, & B-162 are located in SWMU areas. No suspected lead tank bottom materials were observed; however, soil samples were collected and analyzed for site COCs.

Qualifiers:
Q - Qualifier
U - The analyte was analyzed but not detected

Exceedance Summary:
10 - RL exceeds the PADEP Non-Residential Soil MSC
10 - Concentration cxceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Soil Sample Analytical Results: Non SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs	Location ID Sample ID Sample Matrix	B-160 BH-B160-030106-1-1.5 Soil			B-161 BH-B161-030106-1.5-2 Soil			B-162 BH-B162-030106-1-1.5 Soil			B-164 BH-B164-030106-1.5-2 Soil			BH-20-06 BH-20-06-032006-1-1.5 Soil			BH-21-06 BH-21-06-032006-1.5-2 Soil			BH-22-06 BH-22-06-032106-1.5-2 Soil		
		0-2' Dry	Sample Interval Sample Date	1.0-1.5 3/1/2006			1.5-2.0 3/1/2006			1.0-1.5 3/1/2006			1.5-2.0 3/1/2006			1.0-1.5 3/20/2006			1.5-2.0 3/20/2006			1.5-2.0 3/21/2006		
Volatile Organic Compounds			Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**							**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	70000	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	460		200	810		190	ND	U	4
Ethylene dibromide (EDB)	106-93-4	5	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	ND	U	200	ND	U	190	ND	U	4
1,2-Dichloroethane	107-06-2	500	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	ND	U	200	ND	U	190	ND	U	4
Toluene	108-88-3	100000	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	410		200	ND	U	190	ND	U	4
Xylene (Total)	1330-20-7	1000000	ug/kg	ND	U	5	5100		440	ND	U	5	ND	U	370	1000		200	830		190	ND	U	4
Methyl Tertiary Butyl Ether	1634-04-4	2000	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	ND	U	200	ND	U	190	ND	U	4
Benzene	71-43-2	500	ug/kg	ND	U	5	ND	U	440	ND	U	5	ND	U	370	290		200	340		190	ND	U	4
Cumene	98-82-8	1600000	ug/kg	ND	U	5	2200		440	ND	U	5	2200		370	9700		2000	32000		1900	ND	U	4
Semi Volatile Organic Compounds																								
Anthracene	120-12-7	350000	ug/kg	ND	U	220	360		210	ND	U	180	ND	U	200	2500		2100	ND	U	1800	ND	U	190
Pyrene	129-00-0	2200000	ug/kg	ND	U	220	2100		210	320		180	500		200	6900		2100	ND	U	1800	220		190
Benzo(g,h,i)perylene	191-24-2	180000	ug/kg	ND	U	220	1300		210	ND	U	180	270		200	2900		2100	ND	U	1800	290		190
Benzo(b)fluoranthene	205-99-2	110000	ug/kg	ND	U	220	2700		210	290		180	680		200	6300		2100	ND	U	1800	400		190
Chrysene	218-01-9	230000	ug/kg	ND	U	220	2100		210	250		180	360		200	4200		2100	ND	U	1800	ND	U	190
Benzo(a)pyrene	50-32-8	11000	ug/kg	ND	U	220	2200		210	220		180	410		200	4900		2100	ND	U	1800	350		190
Benzo(a)anthracene	56-55-3	110000	ug/kg	ND	U	220	1800		210	200		180	350		200	3800		2100	ND	U	1800	ND	U	190
Phenanthrene	85-01-8	10000000	ug/kg	ND	U	220	410		210	ND	U	180	400		200	37000		2100	ND	U	1800	ND	U	190
Fluorene	86-73-7	3800000	ug/kg	ND	U	220	ND	U	210	ND	U	180	ND	U	200	71000		4200	ND	U	1800	ND	U	190
Naphthalene	91-20-3	25000	ug/kg	ND	U	220	340		210	ND	U	180	ND	U	200	ND	U	2100	ND	U	1800	ND	U	190
Metals																								
Lead (Total)	7439-92-1	450	mg/kg	30.8		2.54	70.1		2.48	584		2.09	18.5		2.41	145		2.44	286		2.15	165		2.16

Notes:
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mg/kg - milligram per kilogram
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(1) All soil samples collected and analyzed were unsaturated.
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Qualifiers:
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10 - RL exceeds the PADEP Non-Residential Soil MSC
10 - Concentration cxceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Soil Sample Analytical Results: Non SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs	Location ID	BH-23-06			BH-24-06			BH-25-06			BH-26-06			BH-27-06			BH-28-06			BH-29-06		
			Sample ID	BH-23-06-032106-1-1.5			BH-24-06-032106-1-1.5			BH-25-06-032106-1-1.5			BH-26-06-032406-0.5-1			BH-27-06-032306-1-1.5			BH-28-06-032306-1-1.5			BH-29-06-032106-1.5-2		
			Sample Matrix	Soil			Soil			Soil			Soil			Soil			Soil			Soil		
		0-2' Dry	Sample Interval	1-1.5			1-1.5			1-1.5			0.5-1.0			1-1.5			1-1.5			1.5-2.0		
			Sample Date	3/21/2006			3/21/2006			3/21/2006			3/24/2006			3/23/2006			3/23/2006			3/21/2006		
Volatile Organic Compounds			Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	70000	ug/kg	ND	U	210	ND	U	170	300		220	2700		180	1600		180	670		380	ND	U	230
Ethylene dibromide (EDB)	106-93-4	5	ug/kg	ND	U	210	ND	U	170	ND	U	220	ND	U	180	ND	U	180	ND	U	380	ND	U	230
1,2-Dichloroethane	107-06-2	500	ug/kg	ND	U	210	ND	U	170	ND	U	220	ND	U	180	ND	U	180	ND	U	380	ND	U	230
Toluene	108-88-3	100000	ug/kg	ND	U	210	200		170	1700		220	260000		18000	ND	U	180	590		380	ND	U	230
Xylene (Total)	1330-20-7	1000000	ug/kg	370		210	560		170	1100		220	9300		180	770		180	580		380	560		230
Methyl Tertiary Butyl Ether	1634-04-4	2000	ug/kg	ND	U	210	ND	U	170	ND	U	220	ND	U	180	ND	U	180	ND	U	380	ND	U	230
Benzene	71-43-2	500	ug/kg	ND	U	210	ND	U	170	2300		220	180000		18000	2200		180	1300		380	410		230
Cumene	98-82-8	1600000	ug/kg	810		210	9900		170	2700		220	800000		18000	9100		180	6400		380	990		230
Semi Volatile Organic Compounds																								
Anthracene	120-12-7	350000	ug/kg	1300		630	3900		1900	10000		2100	ND	U	180	3300		1900	2500		190	27000		2100
Pyrene	129-00-0	2200000	ug/kg	1600		630	5800		1900	11000		2100	300		180	2000		1900	8900		960	110000		10000
Benzo(g,h,i)perylene	191-24-2	180000	ug/kg	890		630	ND	U	1900	3600		2100	ND	U	180	ND	U	1900	1900		190	29000		2100
Benzo(b)fluoranthene	205-99-2	110000	ug/kg	1200		630	ND	U	1900	8100		2100	ND	U	180	ND	U	1900	6000		960	75000		10000
Chrysene	218-01-9	230000	ug/kg	1300		630	2000		1900	4800		2100	ND	U	180	ND	U	1900	4300		190	73000		10000
Benzo(a)pyrene	50-32-8	11000	ug/kg	1100		630	ND	U	1900	6000		2100	ND	U	180	ND	U	1900	4200		960	59000		10000
Benzo(a)anthracene	56-55-3	110000	ug/kg	790		630	ND	U	1900	5300		2100	ND	U	180	ND	U	1900	4000		190	70000		10000
Phenanthrene	85-01-8	10000000	ug/kg	7400		630	46000		1900	120000		10000	210		180	36000		1900	16000		960	91000		10000
Fluorene	86-73-7	3800000	ug/kg	3500		630	63000		3900	120000		10000	ND	U	180	16000		1900	12000		960	14000		2100
Naphthalene	91-20-3	25000	ug/kg	980		630	ND	U	1900	2400		2100	ND	U	180	12000		1900	1000		190	2400		2100
Metals																								
Lead (Total)	7439-92-1	450	mg/kg	417		2.48	233		2.31	231		2.46	32.6		2.15	167		2.26	200		2.23	2520		2.48

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Table 5
Summary of Soil Sample Analytical Results: SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	Analytical Method	CAS No	PADEP Non-Residential MSCs	EPA Maximum Concentration of Contaminants for Toxicity Concentration	Location ID Sample ID Sample Matrix Sample Interval Sample Date SWMU Number	BH-02-06 BH-02-06-032206-1.5-2 Soil 1.5-2.0 3/29/2006 92			BH-03-06 BH-03-06-032206-1.5-2 Soil 1.5-2.0 3/29/2006 92			BH-13-06 BH-13-06-032206-1-1.5 Soil 1.0-1.5 3/22/2006 92			BH-14-06 BH-14-06-032306-0.5-1 Soil 0.5-1.0 3/29/2006 92		
			0-2' Dry														
Metals					**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Lead (Total)	SW846 6010B	7439-92-1	450	-	mg/kg	1260		3.4	1650		2.92	283		3.15	1040		2.87
TCLP Metals																	
Lead (Total)	SW846 1311	7439-92-1	-	5	mg/l	0.24		0.02	0.0901		0.02	-	-	-	1.12		0.02

Notes:
EPA - Environmental Protection Agency
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligrams per kilogram
mg/l - milligrams per liter
MSC - PADEP's Medium Specific Concentration for Soil
RL - Reporting Limit
(1) All soil samples collected and analyzed were unsaturated

Qualifiers:
Q - Qualifier

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

Table 6
Summary of Groundwater Analytical Results: Fill/Alluvium Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	B-45 B45-060806 6/8/2006 Groundwater ug/l			B-46 B46-060706 6/7/2006 Groundwater ug/l			B-48 B48-060806 6/8/2006 Groundwater ug/l			B-92 B92-060706 6/7/2006 Groundwater ug/l			B-94 B94-060906 6/9/2006 Groundwater ug/l			B-115 B115-060706 6/7/2006 Groundwater ug/l			B-116 B-116-081006 8/10/2006 Groundwater ug/l			B-117 B117-060706 6/7/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.029	ND	U	0.028	ND	U	0.028	ND	U	0.029	ND	U	0.028	ND	U	0.029	ND	U	0.028
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Toluene	108-88-3	1000	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	20		5	ND	U	5	ND	U	5	ND	U	5
Benzene	71-43-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Cumene	98-82-8	2300	ug/l	ND	U	5	ND	U	5	ND	U	5	7		5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Semi-Volatile Organic Compounds																											
Pyrene	129-00-0	130	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	ND	U	5	ND	U	5	ND	U	5	15		5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Fluorene	86-73-7	1900	ug/l	ND	U	5	ND	U	5	6		5	24		5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Naphthalene	91-20-3	100	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Metals																											
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams per liter
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater
RL - Reporting limit (limit of quantitation)
ND - Not detected
TBS- To be sampled
U-3 was not sampled due to the presence of LNAPL; however, at the time SECOR gauged U-3 and it did not contain LNAPL.

Qualifiers:
Q - Qualifier
U - Analyte was analyzed but not detected

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 6
Summary of Groundwater Analytical Results: Fill/Alluvium Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	B-123 B123-060706 6/7/2006 Groundwater ug/l			B-125 B125-060606 6/6/2006 Groundwater ug/l			B-126 B126-060606 6/6/2006 Groundwater ug/l			B-131 B131-060606 6/6/2006 Groundwater ug/l			B-145 B145-060906 6/9/2006 Groundwater ug/l			B-149 B149-060806 6/9/2006 Groundwater ug/l			B-151 B151-060806 6/8/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	12		5	24		5	ND	U	5	ND	U	5	ND	U	250	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.028	ND	U	0.028	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	250	ND	U	5
Toluene	108-88-3	1000	ug/l	ND	U	5	79		5	61		5	ND	U	5	ND	U	5	2200		250	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	ND	U	5	110		5	110		5	ND	U	5	11		5	ND	U	250	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	250	ND	U	5
Benzene	71-43-2	5	ug/l	ND	U	5	73		5	220		5	ND	U	5	43		5	79000		2500	ND	U	5
Cumene	98-82-8	2300	ug/l	38		5	10		5	42		5	17		5	78		5	810		250	ND	U	5
Semi-Volatile Organic Compounds																								
Pyrene	129-00-0	130	ug/l	7		5	7		5	6		5	6		5	12		5	ND	U	5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	17		5	7		5	16		5	ND	U	5	43		5	ND	U	5	ND	U	5
Fluorene	86-73-7	1900	ug/l	45		5	17		5	36		5	ND	U	5	50		5	ND	U	5	ND	U	5
Naphthalene	91-20-3	100	ug/l	ND	U	5	7		5	23		5	ND	U	5	11		5	7		5	ND	U	5
Metals																								
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams per liter
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater
RL - Reporting limit (limit of quantitation)
ND - Not detected
TBS- To be sampled
U-3 was not sampled due to the presence of LNAPL; however, at the time SECOR gauged U-3 and it did not contain LNAPL.

Qualifiers:
Q - Qualifier
U - Analyte was analyzed but not detected

Exceedance Summary:
10 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,5
10 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 6
Summary of Groundwater Analytical Results: Fill/Alluvium Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	B-152 B152-060906 6/9/2006 Groundwater ug/l			B-153 B153-060906 6/9/2006 Groundwater ug/l			B-154 B154-060806 6/8/2006 Groundwater ug/l			B-155 B155-060806 6/8/2006 Groundwater ug/l			B-156 B156-060806 6/8/2006 Groundwater ug/l			B-157 B157-060906 6/9/2006 Groundwater ug/l			B-158 B158-060806 6/8/2006 Groundwater ug/l			B-159 B159-060806 6/8/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	ND	U	5	ND	U	1000	ND	U	1000	6		5	14		5	ND	U	5	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	5	ND	U	1000	ND	U	1000	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Toluene	108-88-3	1000	ug/l	6		5	ND	U	5	6200		1000	ND	U	1000	22		5	40		5	ND	U	5	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	5		5	ND	U	5	ND	U	1000	ND	U	1000	39		5	79		5	ND	U	5	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	ND	U	5	ND	U	5	ND	U	1000	ND	U	1000	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Benzene	71-43-2	5	ug/l	78		5	ND	U	5	450000		10000	280000		10000	390		50	66		5	ND	U	5	ND	U	5
Cumene	98-82-8	2300	ug/l	94		5	9		5	ND	U	1000	ND	U	1000	84		5	6		5	ND	U	5	ND	U	5
Semi-Volatile Organic Compounds																											
Pyrene	129-00-0	130	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	20		5	ND	U	5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5	6		5	ND	U	5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	ND	U	5	ND	U	5	18		5	14		5	17		5	25		5	ND	U	5	ND	U	5
Fluorene	86-73-7	1900	ug/l	7		5	ND	U	5	21		5	10		5	16		5	14		5	ND	U	5	9		5
Naphthalene	91-20-3	100	ug/l	ND	U	5	ND	U	5	76		5	29		5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Metals																											
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	0.0166		0.001	ND	U	0.001	ND	U	0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams per liter
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater
RL - Reporting limit (limit of quantitation)
ND - Not detected
TBS- To be sampled
U-3 was not sampled due to the presence of LNAPL; however, at the time SECOR gauged U-3 and it did not contain LNAPL.

Qualifiers:
Q - Qualifier
U - Analyte was analyzed but not detected

Exceedance Summary:
10 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,5
10 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 6
Summary of Groundwater Analytical Results: Fill/Alluvium Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	B-160 B160-060806 6/8/2006 Groundwater ug/l			B-162 B-162-081006 8/10/2006 Groundwater ug/l			B-163 B163-060906 6/9/2006 Groundwater ug/l			B-164 B164-060606 6/6/2006 Groundwater ug/l			U-1 U1-060606 6/6/2006 Groundwater ug/l			U-2 U2-060606 6/6/2006 Groundwater ug/l			U-4 U4-060606 6/6/2006 Groundwater ug/l			U-5 U5-060606 6/6/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	ND	U	25	ND	U	25	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.028	ND	U	0.029	ND	U	0.028	ND	U	0.028	ND	U	0.029	ND	U	0.029	ND	U	0.028
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	25	ND	U	25	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Toluene	108-88-3	1000	ug/l	ND	U	5	ND	U	25	ND	U	25	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	ND	U	5	ND	U	25	ND	U	25	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	ND	U	5	ND	U	25	ND	U	25	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Benzene	71-43-2	5	ug/l	ND	U	5	ND	U	25	4800		250	ND	U	5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Cumene	98-82-8	2300	ug/l	ND	U	5	ND	U	25	ND	U	25	7		5	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Semi-Volatile Organic Compounds																											
Pyrene	129-00-0	130	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	2600		250	ND	U	5	ND	U	5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	810		50	ND	U	5	ND	U	5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	ND	U	5	ND	U	5	20		5	ND	U	5	1100		50	ND	U	5	ND	U	5	ND	U	5
Fluorene	86-73-7	1900	ug/l	ND	U	5	ND	U	5	35		5	ND	U	5	550		50	ND	U	5	ND	U	5	ND	U	5
Naphthalene	91-20-3	100	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	60		50	ND	U	5	ND	U	5	ND	U	5
Metals																											
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	0.005		0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	0.0036		0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams per liter
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater
RL - Reporting limit (limit of quantitation)
ND - Not detected
TBS- To be sampled
U-3 was not sampled due to the presence of LNAPL; however, at the time SECOR gauged U-3 and it did not contain LNAPL.

Qualifiers:
Q - Qualifier
U - Analyte was analyzed but not detected

Exceedance Summary:
10 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,5
10 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 6
Summary of Groundwater Analytical Results: Fill/Alluvium Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	URS-1 URS1-060606 6/6/2006 Groundwater ug/l			URS-2 URS2-060606 6/6/2006 Groundwater ug/l			URS-3 URS3-060606 6/6/2006 Groundwater ug/l			URS-4 URS4-060606 6/6/2006 Groundwater ug/l			URS-5 URS5-060606 6/6/2006 Groundwater ug/l			WP16-5 WP16-5-060906 6/9/2006 Groundwater ug/l			WPM-11 WPM11-060906 6/9/2006 Groundwater ug/l			WPM-8 WPM8-060906 6/9/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	600		25	ND	U	5	ND	U	5	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.029	ND	U	0.028	ND	U	0.028	ND	U	0.029	ND	U	0.029	ND	U	0.029	ND	U	0.029
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	140		25	ND	U	5	ND	U	5	ND	U	5
Toluene	108-88-3	1000	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	4900		250	ND	U	5	ND	U	5	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	ND	U	5	7		5	9		5	ND	U	5	2900		250	ND	U	5	ND	U	5	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	8		5	ND	U	5	ND	U	5	ND	U	5	ND	U	25	ND	U	5	ND	U	5	23		5
Benzene	71-43-2	5	ug/l	ND	U	5	8		5	18		5	ND	U	5	5900		250	ND	U	5	ND	U	5	ND	U	5
Cumene	98-82-8	2300	ug/l	ND	U	5	11		5	18		5	ND	U	5	37		25	ND	U	5	ND	U	5	40		5
Semi-Volatile Organic Compounds																											
Pyrene	129-00-0	130	ug/l	ND	U	5	ND	U	5	160		25	ND	U	5	ND	U	5	ND	U	5	50		5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	45		5	ND	U	5	ND	U	5	ND	U	5	28		5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	ND	U	5	6		5	260		25	ND	U	5	25		5	ND	U	5	14		5	ND	U	5
Fluorene	86-73-7	1900	ug/l	ND	U	5	ND	U	5	98		5	ND	U	5	17		5	ND	U	5	6		5	ND	U	5
Naphthalene	91-20-3	100	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5	270		24	ND	U	5	ND	U	5	ND	U	5
Metals																											
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams per liter
MSC - PADEP's Medium Specific Concentration for Impact to Groundwater
RL - Reporting limit (limit of quantitation)
ND - Not detected
TBS- To be sampled
U-3 was not sampled due to the presence of LNAPL; however, at the time SECOR gauged U-3 and it did not contain LNAPL.

Qualifiers:
Q - Qualifier
U - Analyte was analyzed but not detected

Exceedance Summary:
10 - Reporting limit exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,5
10 - Compound exceeds the PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500

Table 7
Summary of Groundwater Analytical Results: Lower Sand Wells
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

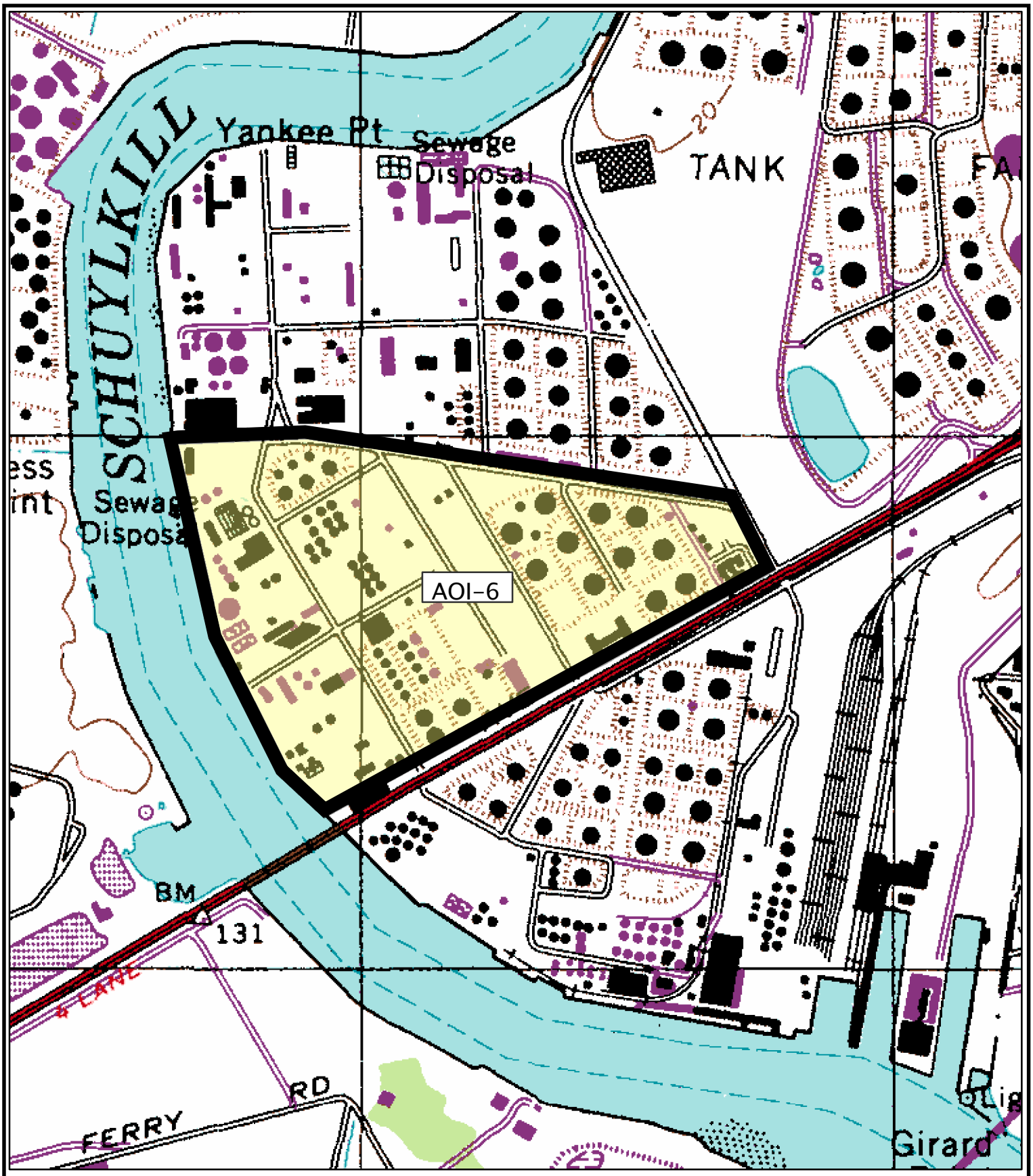
	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500	Location ID Sample ID Sample Date Sample Matrix Unit	B-48D B48D-060806 6/8/2006 Groundwater ug/l			B-132D B132D-060606 6/6/2006 Groundwater ug/l			B-133D B133D-060606 6/6/2006 Groundwater ug/l			B-134D B134D-060606 6/6/2006 Groundwater ug/l		
Volatile Organic Compounds			**Unit**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Ethylbenzene	100-41-4	700	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Ethylene dibromide (EDB)	106-93-4	0.05	ug/l	ND	U	0.029	ND	U	0.029	ND	U	0.028	ND	U	0.028
1,2-Dichloroethane	107-06-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Toluene	108-88-3	1000	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Xylene (Total)	1330-20-7	10000	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Benzene	71-43-2	5	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Cumene	98-82-8	2300	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Semi-Volatile Organic Compounds															
Pyrene	129-00-0	130	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Chrysene	218-01-9	1.9	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Phenanthrene	85-01-8	1100	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Fluorene	86-73-7	1900	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Naphthalene	91-20-3	100	ug/l	ND	U	5	ND	U	5	ND	U	5	ND	U	5
Metals															
Lead (Total)	7439-92-1	5	mg/l	ND	U	0.001	ND	U	0.001	ND	U	0.001	ND	U	0.001

Notes:
PADEP - Pennsylvania Department of Environmental Protection
ug/l - Micrograms per liter
mg/l - Milligrams 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

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

FIGURES



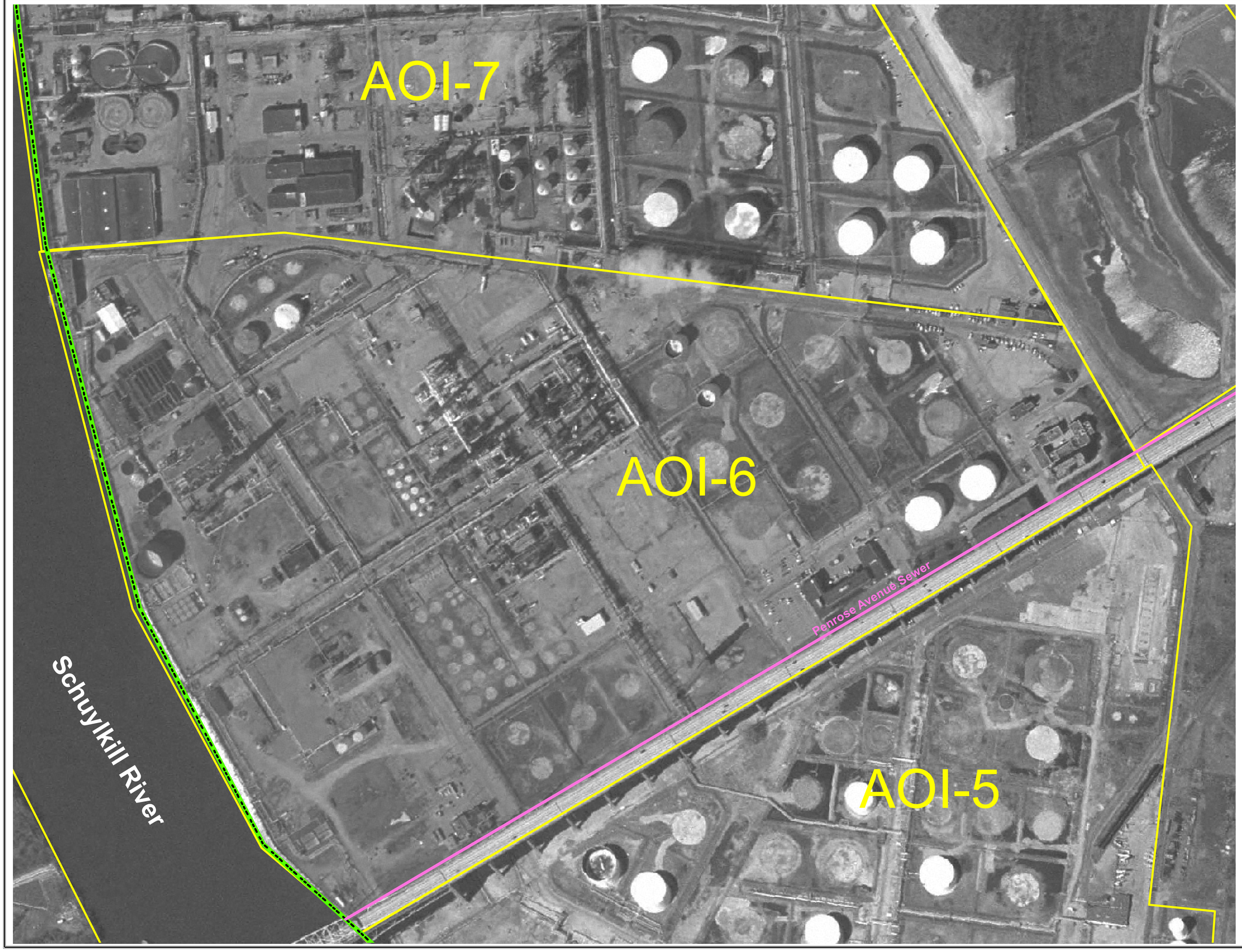
USGS Topographic Map, Philadelphia, PA. Quadrangle, USGS 1995

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

Figure 1: Site Location Map: AOI 6
AOI 6 Site Characterization
Sunoco Philadelphia Refinery
Philadelphia Pennsylvania

Job Number	Scale: 1" = 800'	Date
2574601	0 400 800 Feet	July 19, 2006

Q:\Data6\2574601\ArcGIS\MapDocuments\AOI 6 Site Characterization\Figure 1- AOI 6 Boundaries.mxd



N
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Legend

- AOI Boundary
- Sheet Pile Wall
- Penrose Avenue Sewer

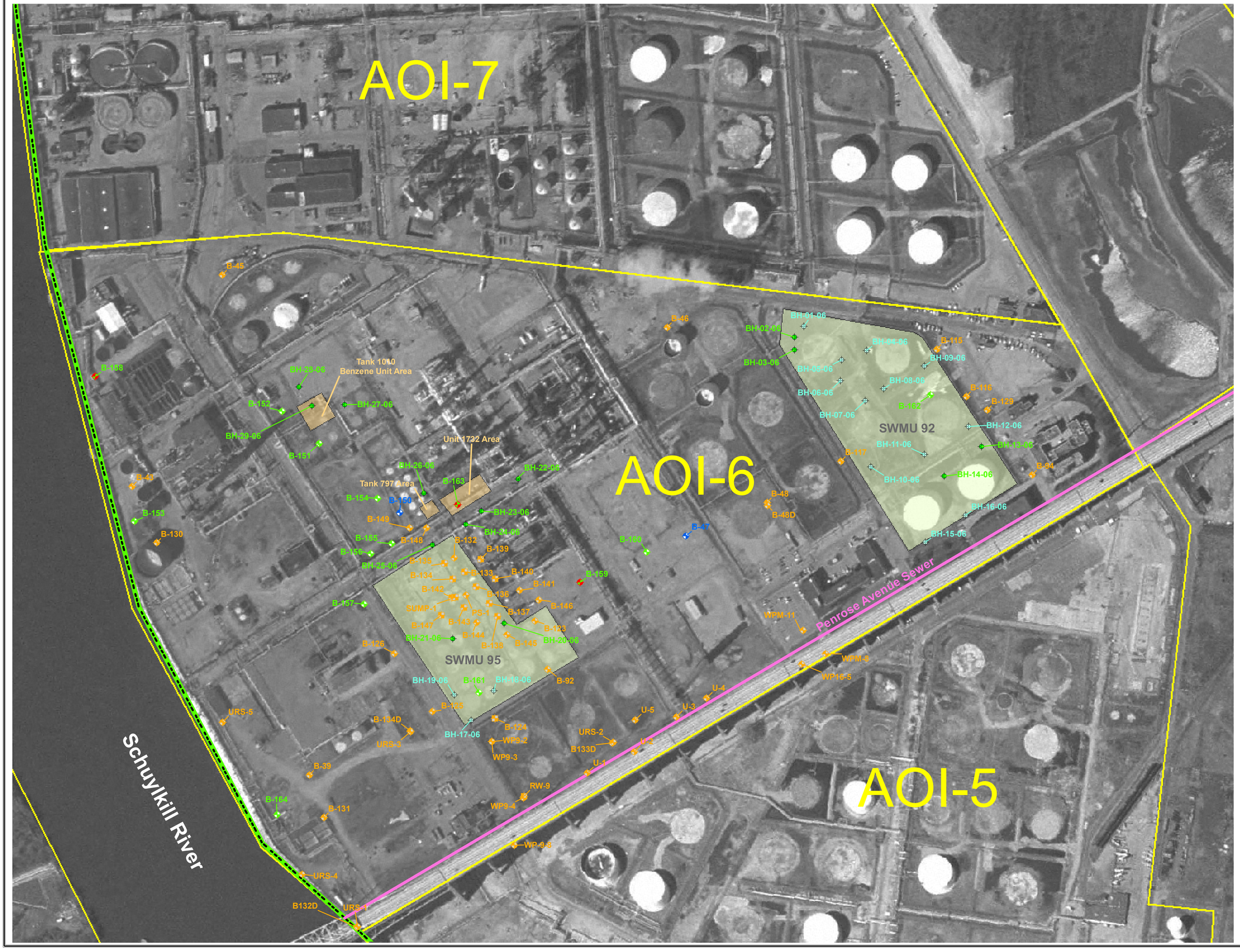
Figure 2: Site Plan
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 30, 2006
DRN. BY: AE
CKD. BY: JH
JOB#: 257460

G:\Shell\257460\ArcGIS\MapDocuments\AOI 6 Site Characterization\Figure 2 Site Plan.mxd



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Legend

- BH-02-06 — Shallow Soil Boring Locations with Soil Samples
- BH-01-06 — Shallow Soil Boring Locations without Soil Samples
- BH-152 — New Fill/Alluvium Monitoring Well with Soil Sample
- B-158 — New Fill/Alluvium Monitoring Well
- B-150 — LNAPL Sample Location
- B-133 — Existing Monitoring Well
- RW-9 — Existing Recovery Well
- Leaded Tank Bottom Solid Waste Management Unit (SWMU)
- Potential Source Areas
- AOI Boundary
- Sheet Pile Wall
- Penrose Avenue Sewer

Notes:
Boundary of SWMUs referenced from the RCRA Facility Investigation Chevron Refinery Vol 1, Dames and Moore, 11-24-93.

Figure 3: Completed Activities
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 30, 2006
DRN. BY: AE
DES. BY: JH
JOB#: 2574601

G:\Sunoco\2574601\Arc\GIS\Mxd\Documents\AOI-6 Site Characterization\Figure 3 Completed Activities.mxd

AOI-3
AOI-7
AOI-6
AOI-5
J
H
K
C
Q
Q'
Schuylkill River
C-107
C-64
C-97
C-127
C-52
C-65
C-65D
C-51
C-62
C-53A
C-128
C-108
C-106
PH-40
C-63
C-50D
C-105
C-57
C-50
C-54
C-61
C-110
BF-89
BF-105
BF-100
C-98
C-109
C-111
C-104
PH-41
BF-104
BF-90
C-58
C-95
C-55
C-113
BF-90D
C-56
C-60
C-112
C-59
B-45
S-1
C-49
C-114
B-46
BH-01-06
BH-04-06
S-2
B-158
BH-28-06
BH-02-06
BH-05-06
B-115
BH-09-06
BH-29-06
BH-03-06
BH-08-06
B-162
B-116
B-44
BH-27-06
BH-06-06
B-129
B-148
BH-07-06
BH-12-06
S-3
B-152
B-163
BH-24-06
B-117
BH-11-06
B-94
B-151
BH-26-06
BH-23-06
B-43
BH-22-06
B-48D
A-19
B-149
B-41
B-153
B-48
BH-10-06
A-19D
B-154
B-150
B-93
B-132
B-139
B-130
BH-16-06
B-155
B-133
B-140
B-47
B-156
B-136
B-141
B-160
BH-15-06
B-135
B-159
BH-25-06
B-134
WPM-4
WPM-1
B-142
B-146
WPM-11
WPM-7
B-157
WPM-6
A-118
B-42
B-137
WPM-8
WPM-2
SUMP-1
PS-1
B-123
B-143
WPM-10
WPM-3
A-119
B-147
B-126
BH-21-06
B-145
BH-20-06
B-138
B-161
B-144
WP16-5
B-92
BH-19-06
WP16-1
A-16
B-40
BH-18-06
U-4
U-5
URS-5
WP9-6
WP9-1
WP16-3
WP16-4
URS-3
B-125
B-124
U-2
U-3
B-134D
BH-17-06
WP9-2
URS-2
RWM-9
A-25
WP9-3
A-26
B-39
U-1
A-91
B-164
B-131
WP9-5
WP9-4
A-27
RW-9
B133D
A-23
PZ-135B
WP9-7
A-15
PZ-135A
PZ-132A
WP-9-8
URS-4
URS-1
A-22
A-120
PZ-3
A-24
WP-E
WP-D
A-122
A-121
PZ-2
A-134
RW-6A
A-3
PZ-1
B132D
A-133
WP-C
A-135
A-49
WP-B
WP-A
A-13D
A-43
A-14
SW-5
A-136
A-13
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SW-2
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WP-2
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A-12
A-20
A-46
WP-1A
SW-4
SW-3
SWR-2
A-5
A-45
A-6
A-7
WP-9
SWR-3
A-47
WP-2A
A-48
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WP-7
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RWBH-1
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B-48
B-48D
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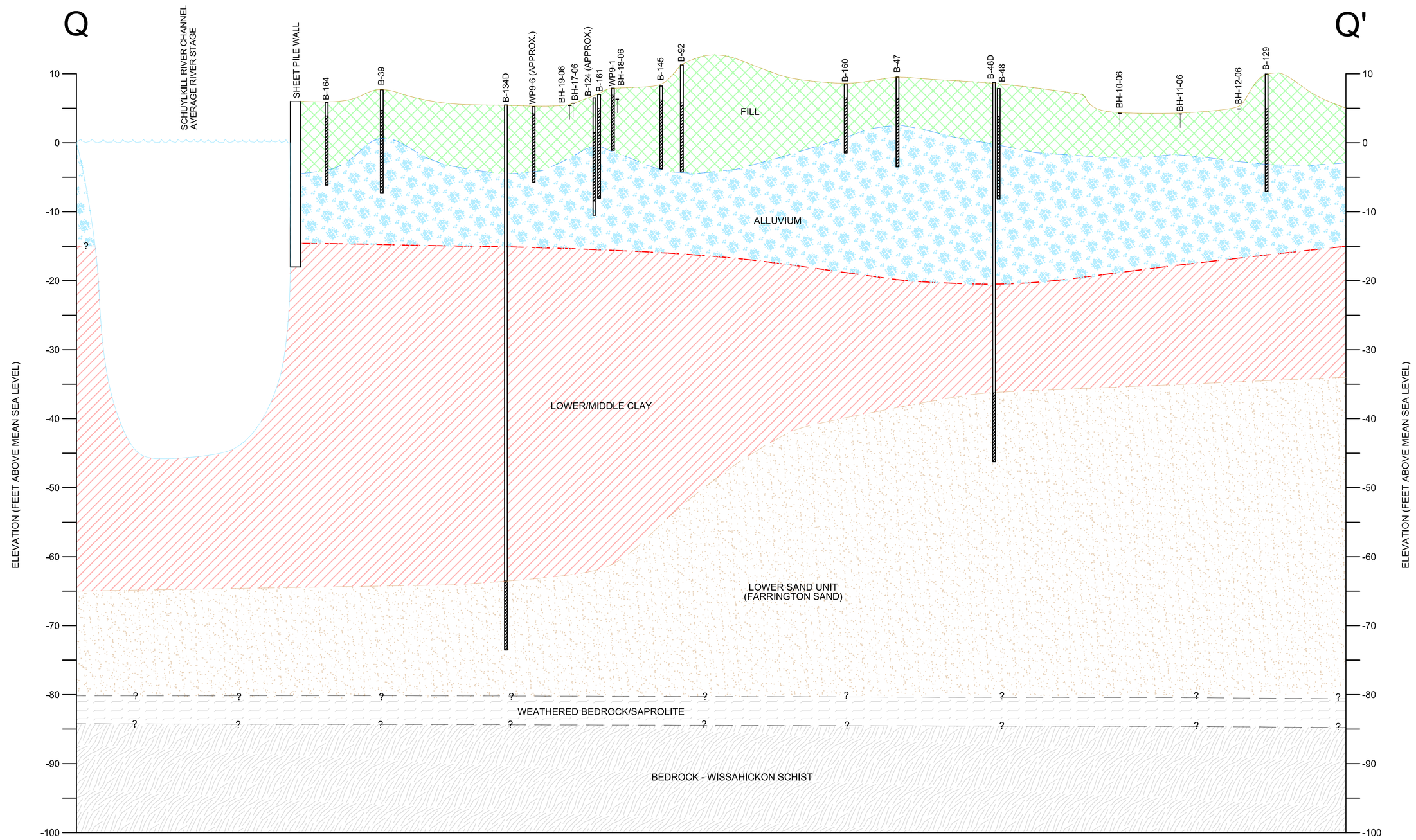
A-157

LEGEND:

- FILL
- ALLUVIUM
- CLAY
- SAND
- WEATHERED BEDROCK
- WISSAHICKON SCHIST
- B-129 LOCATION ID
- INFERRED CONTACTS
- WELL CASING
- WELL SCREEN
- SOIL BORING

NOTES:

1. DEPTH OF SCHUYLKILL RIVER FROM SIMULATION OF GROUNDWATER FLOW IN THE POTOMIC-RARITAN-MAGOTHY AQUIFER SYSTEM NEAR THE DEFENSE SUPPLY CENTER PHILADELPHIA, AND THE POINT BREEZE REFINERY, SOUTHERN PHILADELPHIA COUNTY, PENNSYLVANIA BY CURTIS L. SCHREFFLER DATED 2001.
2. DEPTH OF SHEET PILE WALL DETERMINED FROM FIGURE 3-8 GENERALIZED GEOLOGIC CROSS SECTION A-C DATED 13 NOVEMBER 1992 FROM DAMES & MOORE, RCRA VERIFICATION INVESTIGATION REPORT, CHEVRON REFINERY, 1992. CROSS SECTION RENAMED C-J.
3. CONTACT BETWEEN FILL AND ALLUVIUM IS APPROXIMATED BASED ON AVAILABLE HISTORIC WELL LOGS.



10 0 2 4 10
VERTICAL SCALE IN FEET

200 0 100 200
HORIZONTAL SCALE IN FEET

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Project
SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title
GEOLOGIC CROSS SECTION Q-Q'

Project No. 2574601	Drawing No. 5
Date 30 AUGUST 2006	
Scale 1"=200' HOR. 1"=10' VER.	
Drn. By DMM/AE	
Last Revised X	Of

© 2005 Langan Engineering and Environmental Services Inc.

Filename: S:\Data6\2574601\CADD Drawings\Geologic Cross-Section.dwg Date: 9/11/2006 Time: 10:39 User: aedelman Style Table: Langan.stb Layout: D Size Sheet (Bottom)

Legend

- Fill / Alluvium Monitoring Well and Groundwater Elevation (ft.)
- Recovery Well (Unclassified) and Groundwater Elevation (ft.)
- Fill / Alluvium Recovery Well and Groundwater Elevation (ft.)
- Monitoring Well (Unclassified) and Groundwater Elevation (ft.)
- Other Existing Piezometer
- Other Existing Recovery Well
- Other Existing Well
- Inferred Groundwater Elevation Contour (feet)
- Groundwater Elevation Contour (ft.)
- Sheet Pile Wall
- AOIs
- Penrose Avenue Sewer

Notes:
1. Groundwater elevations based on groundwater gauging data provided by Secor, May 2006.
2. Only those wells accessible during the gauging were use for contouring.

Figure 6: Fill / Alluvium Groundwater Elevations
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 30, 2006
DRN. BY: JSC/AE
CKD. BY: JH
JOB# 3574601

© Copyright 2006 Sunoco, Inc. (R&M)

N
W E
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Legend

- B-134D -4.4 — Lower Sand Monitoring Well and Groundwater Elevation (ft.)
- B-132D — Lower Sand Monitoring Well with No Elevation Data
- AOIs
- Inferred Groundwater Elevation Contour (ft.)
- Groundwater Elevation Contour (ft.)
- Sheet Pile Wall

Notes:
1. Groundwater elevations based on groundwater gauging data provided by Secor, May 2006.
2. Only those wells accessible duirng the gauging were use for contouring.
3. Monitoring wells S-6 and S-46D were not used for contouring.

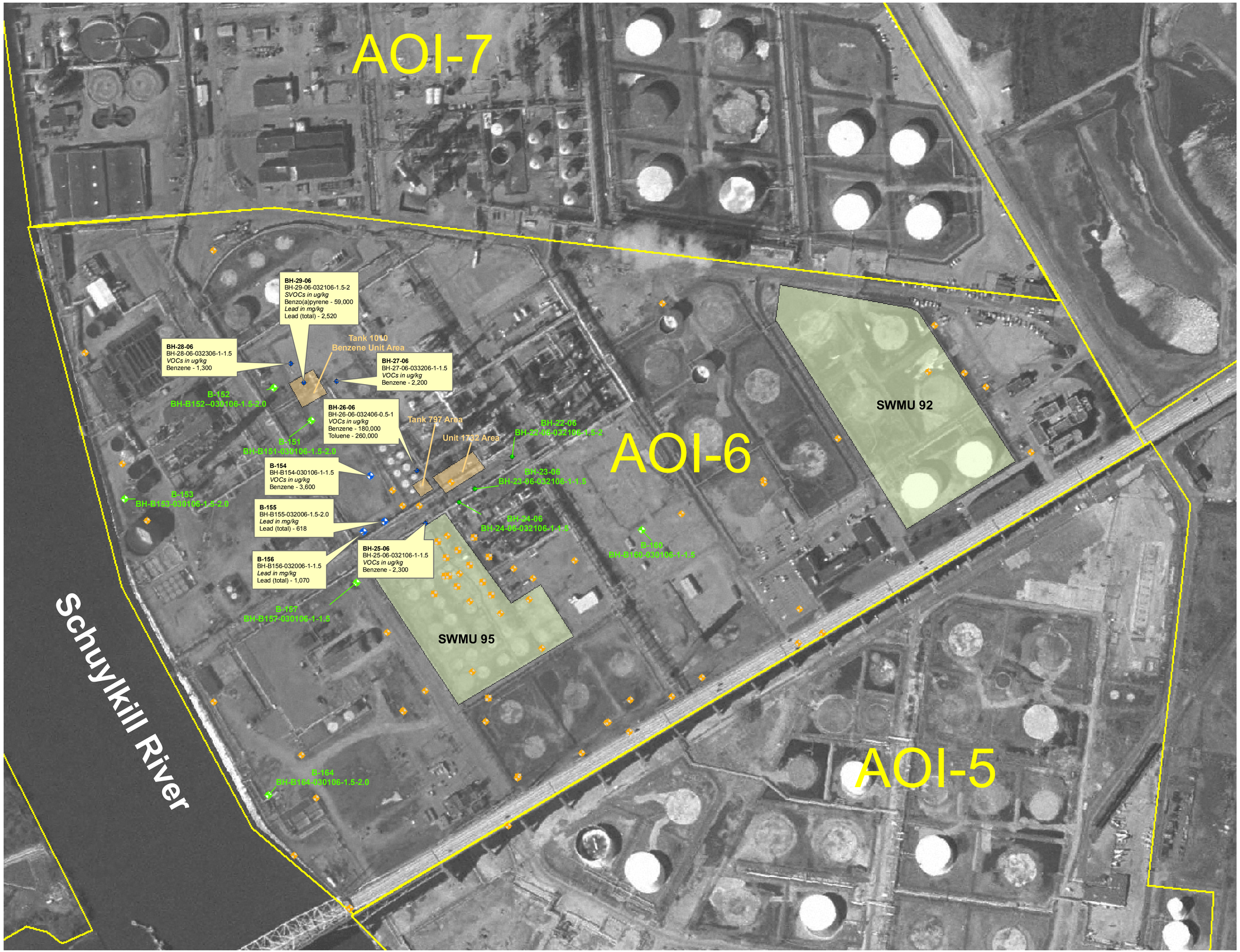
Figure 7: Lower Sand Groundwater Elevations
AOI 6 and Surrounding Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 350 700 Feet

SCALE: 1" = 400'
DATE: August 7, 2006
DRN. BY: JSC/AE
CKD. BY: JH
JOB#. 2574601

O:\Drafts\2574601\Arc\GIS\MapDocuments\AOI 6 Site Characterization\Figure 7 - Lower Sand GW Elevations.mxd



Legend

- BH-22-06 / BH-22-06-032106-1.5-2 — Shallow Soil Boring Location with No Exceedance of PADEP MSCs
- BH-28-06 / BH-28-06-032306-1-1.5 — Shallow Soil Boring Location with Exccedance of PADEP MSCs
- BH-152 / BH-B152-030106-1.5-2 — New Fill/Alluvium Monitoring Well with Soil Sample Not Exceeding PADEP MSCs
- B-154 / BH-154-0.0106-1-1.5 — New Fill/Alluvium Monitoring Well with Soil Sample Exceeding PADEP MSCs
- Existing Monitoring Point
- Existing Recovery Well
- Leaded Tank Bottom Solid Waste Management Unit (SWMU)
- Potential Source Areas
- AOI Boundary
- Sheet Pile Wall

Compounds of Concern for Site Soil and Associated MSCs

	CAS No.	PADEP Non-Residential MSCs 0-2' Dry (ug/kg)
Volatile Organic Compounds		
Ethylbenzene	100-41-4	70000
Ethylene dibromide (EDB)	106-93-4	5
1,2-Dichloroethane	107-06-2	500
Toluene	108-88-3	100000
Xylene (Total)	1330-20-7	1000000
Methyl Tertiary Butyl Ether	1634-04-4	2000
Benzene	71-43-2	500
Cumene	98-82-8	1600000
Semi Volatile Organic Compounds		
Anthracene	120-12-7	350000
Pyrene	129-00-0	2200000
Benzo(g,h,i)perylene	191-24-2	180000
Benzo(b)fluoranthene	205-99-2	110000
Chrysene	218-01-9	230000
Benzo(a)pyrene	50-32-8	11000
Benzo(a)anthracene	56-55-3	110000
Phenanthrene	85-01-8	10000000
Fluorene	86-73-7	3800000
Naphthalene	91-20-3	25000
Metals		
Lead (Total)	7439-92-1	450 (mg/kg)

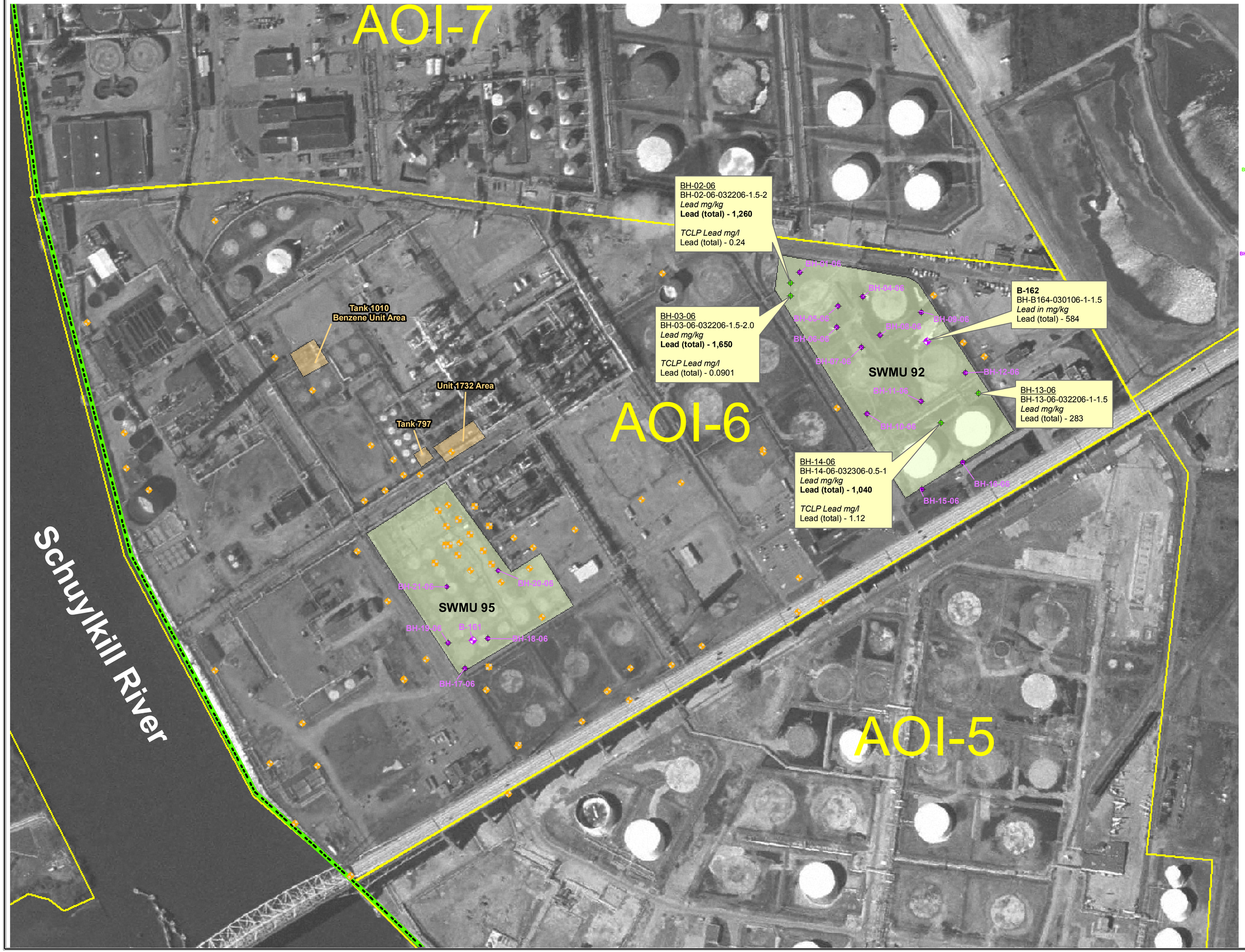
Figure 8: Summary of Soil Sample Exceedances: Non SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 14, 2006
DRN. BY: JSC/AE
DES. BY: JH
JOB#: 2574601

Q:\Data\2574601\ArcGIS\MapDocuments\AOI 6 Site Characterization\Figure 8 Summary of Non SWMUs Soil Sample Exceedances.mxd



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Legend

- BH-02-06 / BH-02-06-032206-1.5-2 — Shallow SWMU Soil Boring Locations with Suspected Leaded Tank Bottom Materials Observed
- BH-05-06 — Shallow SWMU Soil Boring Location with Leaded Tank Bottom Materials Not Observed
- B-161 / BH-B161-030106-1.5-2 — Fill/Alluvium Non SWMU Monitoring Well
- Existing Monitoring Point
- Existing Recovery Well
- Potential Source Areas
- Leaded Tank Bottom Solid Waste Management Unit (SWMU)
- AOI Boundary
- Sheet Pile Wall

Compound of Concern for SWMU Areas and PADEP MSCs and EPA TCLP Standards

	Analytical Method	CAS No	PADEP Non-Residential MSCs	EPA Maximum Concentration of Contaminants for Toxicity Concentration
			0-2' Dry	
Metals				
Lead (Total)	SW846 6010B	7439-92-1	450 (mg/kg)	
TCLP Metals				
Lead (Total)	SW846 1311	7439-92-1	-	5 (mg/L)

Notes:
1. The soil boring B-162 did not display visual characteristics of a leaded tank bottom; however, the sample did exceed the PADEP lead MSC.
2. The soil boring BH-13-06 displayed visual characteristics of leaded tank bottom material and was therefore analyzed for lead. However, the sample did not exceed the PADEP MSC so the sample was not analyzed by TCLP.

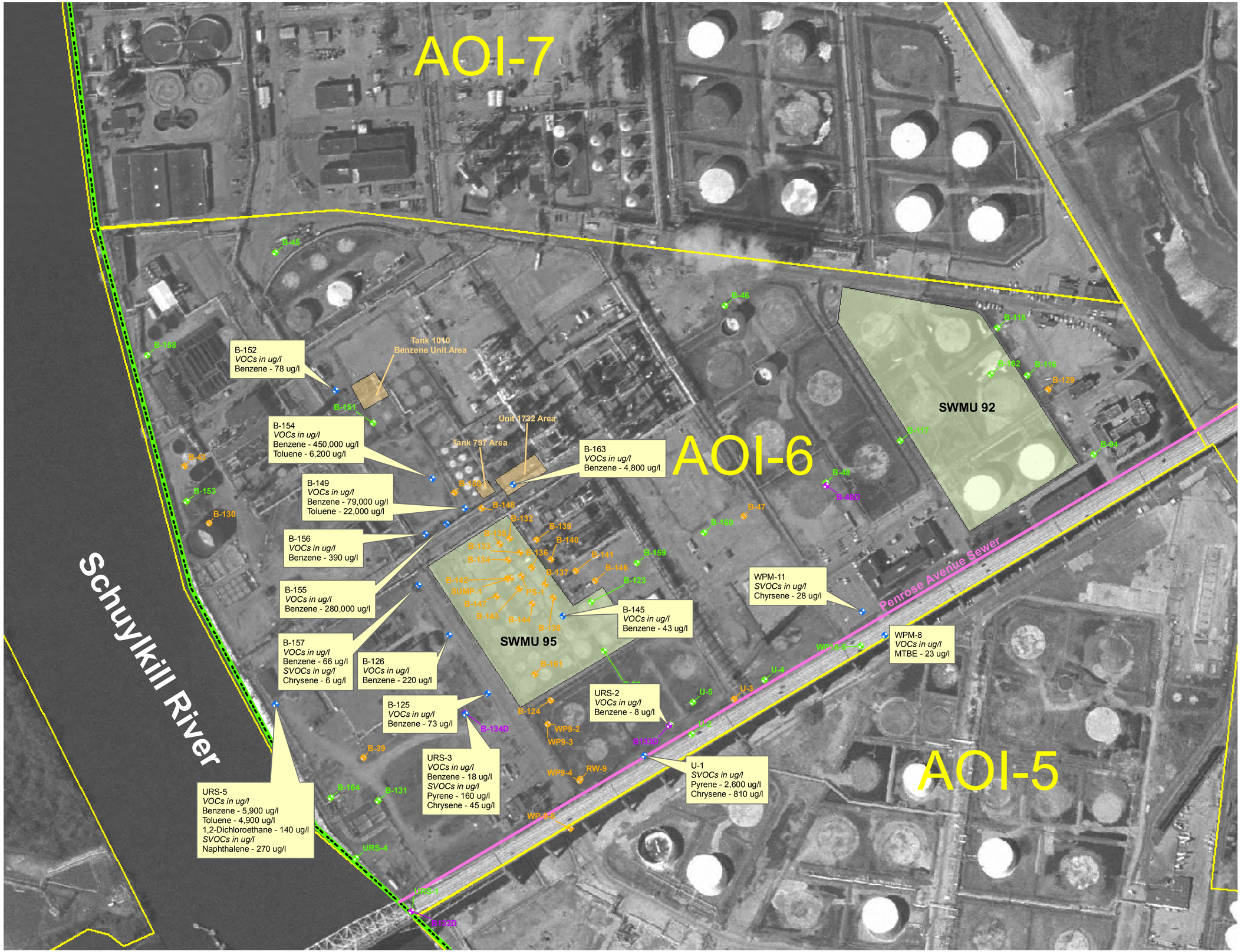
Figure 9: Summary of Soil Sample Exceedances: SWMU Areas
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 14, 2006
DRN. BY: JSCAE
CKD. BY: JH
JOB#: 2574601

Q:\Data\257460\1\ArcGIS\MapDocuments\AOI 6 Site Characterization\Figure 9 Summary of SWMU Soil Sample Exceedances.mxd



N
W E
S

Legend

- B-158 — Fill/Alluvium Monitoring Well with No Exceedance of PADEP MSCs
- WPM-8 — Fill/Alluvium Monitoring Well with Exceedance of PADEP MSCs
- WPM-8 — Lower Sand Monitoring Well with No Exceedance of PADEP MSCs
- B-133 — Existing Monitoring Point Not Sampled (Contained LNAPL or Not Sampled)
- Potential Source Areas
- Leaded Tank Bottom Solid Waste Management Unit (SWMU)
- AOI Boundary
- Sheet Pile Wall
- Penrose Avenue Sewer

Compounds of Concern for Site Groundwater and Associated MSCs

	CAS No	PADEP Non-Residential Used Aquifer MSC for Groundwater TDS<2,500 (ug/l)
Volatile Organic Compounds		
Ethylbenzene	100-41-4	700
Ethylene dibromide (EDB)	106-93-4	0.05
1,2-Dichloroethane	107-06-2	5
Toluene	108-88-3	1000
Xylene (Total)	1330-20-7	10000
Methyl Tertiary Butyl Ether	1634-04-4	20
Benzene	71-43-2	5
Cumene	98-82-8	2300
Semi-Volatile Organic Compounds		
Pyrene	129-00-0	130
Chrysene	218-01-9	1.9
Phenanthrene	85-01-8	1100
Fluorene	86-73-7	1900
Naphthalene	91-20-3	100
Metals		
Lead (Total)	7439-92-1	5 (mg/l)

Figure 10: Summary of Groundwater Sample Exceedances
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 30, 2006
DRN. BY: JSCAS
CKD. BY: JH
JOB#: 2574601

O:\Data\2574601\GIS\Maps\Documents\AOI 6 Site Characterization\Figure 10 Summary of Groundwater Samples Exceedances.mxd

AOI-7

AOI-6

AOI-5

Schuylkill River

Penrose Avenue Sewer

Tank 1010
Benzene Unit Area

Unit 1732 Area

Tank 797 Area

B-43
0.5

B-130
0.66

B-150
1.26

B-148
1.91

B-132
0.21

B-133
0.01

B-136
0.03

B-140
0.26

B-141
0.75

B-135
0.69

B-134
0.22

SUMP-1
0.01

B-147
0.25

B-144
0.12

B-138
5.25

B-161
0.01

B-124
1.38

WP9-2
2.18

B-39
0.01

RW-9
0.61

WP9-4
0.01

WP-9-8
0.53

B-47
0.01

U-3
0.41

B-129
3.73

N
W E
S

Legend

- Monitoring Wells with No LNAPL
- Fill / Alluvium Monitoring Well with Apparent LNAPL Thickness (ft.)
- Recovery Well (Unclassified) with Apparent LNAPL Thickness (ft)
- Fill / Alluvium Recovery Well with Apparent LNAPL Thickness (ft)
- Monitoring Well (Unclassified)
- Monitoring Wells with No Gauging
- Potential Source Areas
- AOIs
- Sheet Pile Wall
- Penrose Avenue Sewer

LNAPL Types

- Gasoline
- Residual Oil and Middle Distillate
- Middle Distillate
- Residual Oil

Notes:
1. Groundwater and LNAPL data collected by Secor, May 2006.

Figure 11: Apparent LNAPL Thickness
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

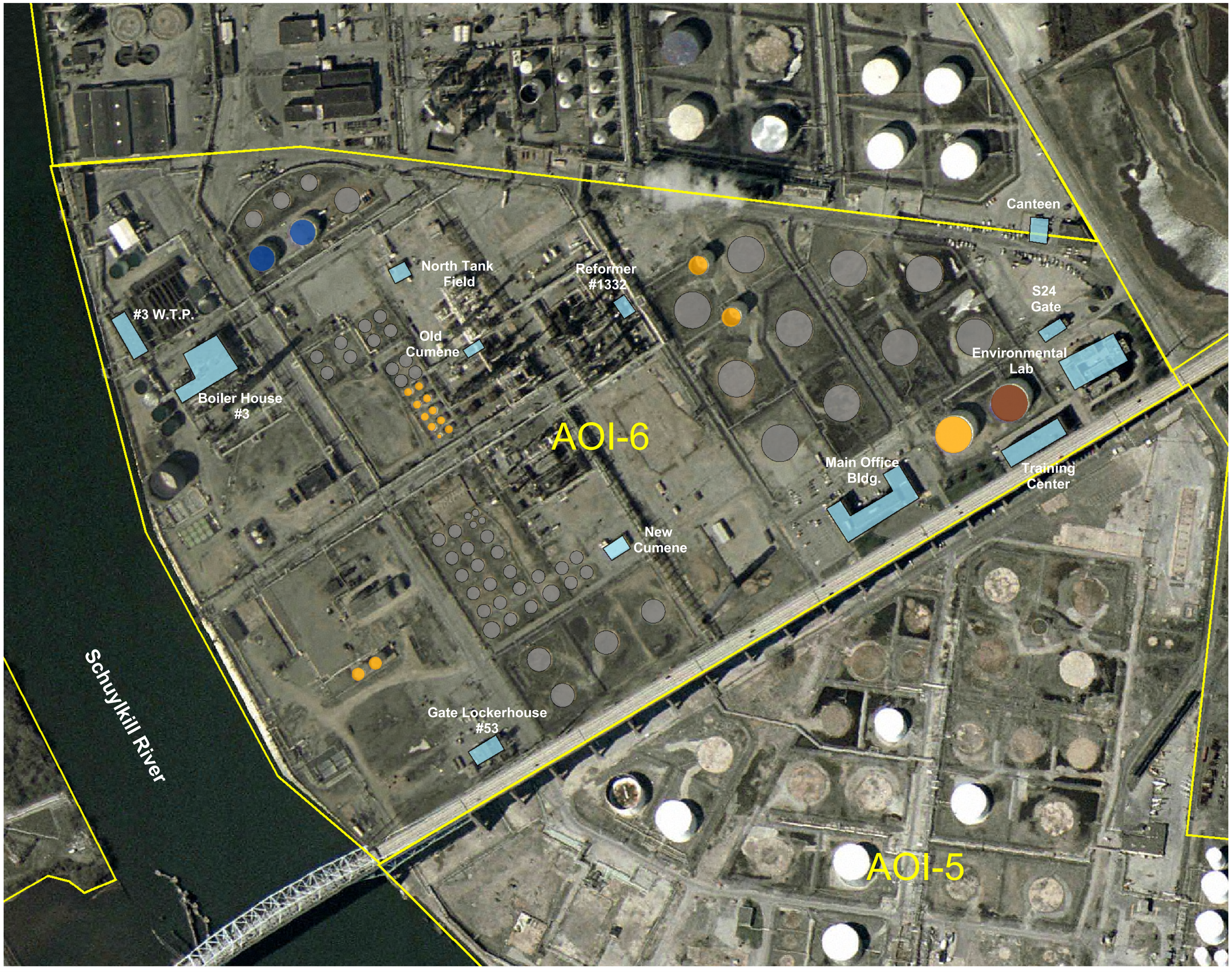
Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 30, 2006
DRN. BY: JSCAR
CK'D. BY: JH
JOB#: 8534601

APPENDIX A

Current and Historic Use Figures



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Legend

Tankage and Contents

- Unknown
- Light Fuels and Chemicals
- Intermediate Fuels
- Removed Tanks
- Current Use Areas
- AOI Boundaries

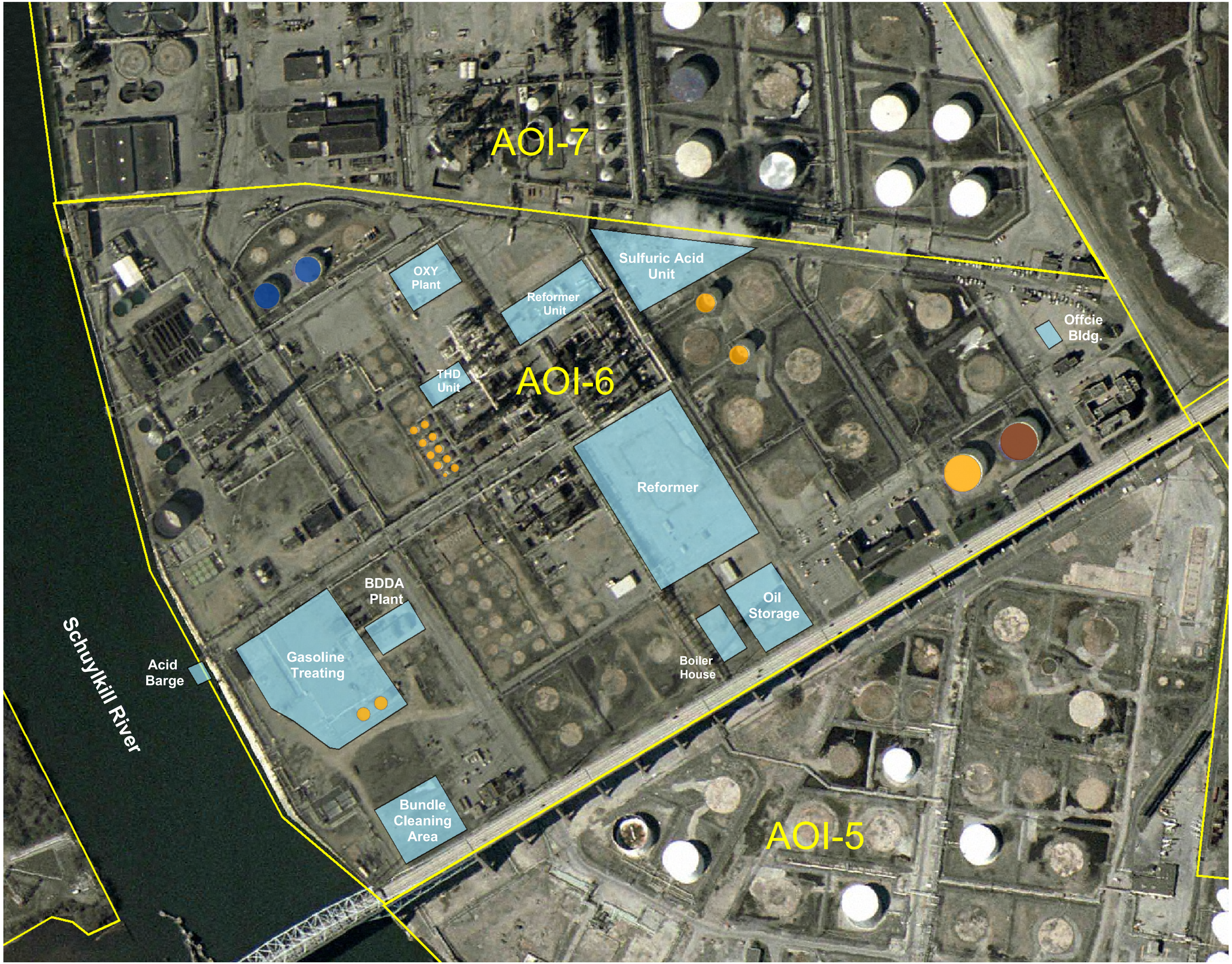
AOI 6 Site Characterization Report
Current Use
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 20
DATE: June 24, 2004
DRN. BY: JSC
CKD. BY: JH
JOB#: 25746O1

G:\Data\25746O1\ArcGIS\MapDocuments\Current_Use_Figures\GP_Current_Use_4_13_04.mxd



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W E
S

Legend

- Intermediate Fuels
- Light Fuels and Chemicals
- Unknown
- AOI Boundaries
- Historic Use Areas

Notes:
1. Historic usage derived from available historic documentation.

AOI 6 Site Characterization Report
Historic Use
Sunoco Philadelphia Refinery
and Belmont Terminal
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 21, 2006
DRN. BY: JSC
CKD. BY: JH
JOB#: 2574601

G:\Data\2574601\ArcGIS\Map\Documents\AOI 6 Site Characterization\AOI 6_Historic_Use_AOI6.mxd

N
W E
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Legend

- Impervious Surfaces
- Impervious Surfaces
- AOI Boundary

Notes:
1. Impervious surfaces estimated based on on-site observation.

AOI 6 Site Characterization Report
Impervious Surfaces
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

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

0 150 300 Feet

SCALE: 1" = 150'
DATE: August 31, 2006
DRN. BY: JSC
CKD. BY: JH
JOB#: 2574601

Q:\Data\2574601\ArcGIS\Map Documents\AOI 6 Site Characterization\AOI 6_Impervious Surfaces_AOI 6.mxd

APPENDIX B

Aquaterra Boring Logs

Aquaterra Technologies, Inc.
Subsurface Log: BH-01-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-01-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and coarse sand with small gravel and fill material
0.5'	0.5-1'		0.5'	Same as above, small cobble/large pebble present. Becoming moist
1'	1-1.5'		0.5'	Moist to wet gray-brown sandy gravel
1.5'	1.5-2'		0.5'	Wet gray coarse sandy gravel and some fill material
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-02-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-02-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown sandy gravel and fill material.
0.5'	0.5-1'		0.5'	Brown sandy gravel and pebble, moist to wet at bottom
1'	1-1.5'		0.5'	Wet brown sandy gravel and pebble
1.5'	1.5-2'		0.5'	Same, with a black waxy sludge material, very thick.
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-03-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-03-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown sandy gravel with brick fragments
0.5'	0.5-1'		0.5'	Same, becoming wet
1'	1-1.5'		0.5'	Wet gray brown sandy gravel
1.5'	1.5-2'		0.5'	Same, with a black waxy sludge material, very thick.
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-04-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-04-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Gray silt and gravel with coarse sand. Cobble and brick fragments present
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Same as above to 1.25' BGS. Changing to a compact gray silt with trace clay
1.5'	1.5-2'		0.5'	Gray silt with trace clay with some lighter gray banding evident
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-05-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-05-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brownish gray silty coarse sand and gravel, slightly moist
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Gray to dark gray silt and medium sand with gravel. Glass and brick fragements
1.5'	1.5-2'		0.5'	Same as above
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-06-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-06-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 0.25'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Wet brownish gray sandy gravel
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Wet gray sandy gravel with brick and wood fragments
1.5'	1.5-2'		0.5'	Same as above
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-07-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-07-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 0.25'

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Wet gray sandy gravel
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Same as above, auger refusal at 1.5' BGS
1.5'			0.5'	Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-08-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-08-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Gravel in a brown silt with high organic content, slight clay , brown in color
0.5'	0.5-1'		0.5'	Same as above with more gravel present and trace coarse sand, becoming gray in color
1'	1-1.5'		0.5'	Gray/brown silty sand with glass and wood fragments
1.5'	1.5-2'		0.5'	Dark gray silty sand and gravel with glass and wood fragments.
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-09-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-09-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and fill stone with brick fragments
0.5'	0.5-1'		0.5'	Dark brown silt and gravel with coarse sand and rock fragments. Some wood debris present
1'	1-1.5'		0.5'	Same as above, slightly moist. Becoming dark brown/gray in color
1.5'	1.5-2'		0.5'	Brick fill and large cobble in dark gray silt and sand with small gravel. Color changes to lighter gray with brown mottling at bottom.
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-10-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-10-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brownish gray silt and coarse sandy gravel
0.5'	0.5-1'		0.5'	Same as above, trace clay
1'	1-1.5'		0.5'	Gray silt and coarse sand with gravel and small pebble
1.5'	1.5-2'		0.5'	Same as above, changing to a silty gray clay, slightly moist
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-11-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-11-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 2'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and coarse sand with gravel and small rock
0.5'	0.5-1'		0.5'	Same as above with some wood fragments
1'	1-1.5'		0.5'	Change to a gray to dark gray sand and silt, moist
1.5'	1.5-2'		0.5'	Dark gray stained silt with trace gravel and sand. Moist to wet
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-12-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-12-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and coarse sand with gravel. Glass fragments present
0.5'	0.5-1'		0.5'	Same as above with brick fragments
1'	1-1.5'		0.5'	Dark gray silt with trace clay, rock fragments and gravel present. Slightly moist
1.5'	1.5-2'		0.5'	Same as above with brick fragments.
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-13-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-13-06 **Log By:** M.B. Spancake **Date:** 22-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 2'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt, rich in organic matter.
0.5'	0.5-1'		0.5'	Dark brown silt with rust/red colored scale in bottom 2"
1'	1-1.5'		0.5'	Gray silty clay with rust/red colored scale material, slightly moist
1.5'	1.5-2'		0.5'	Dark gray clayey silt, trace sand and black scale material. Moist to wet
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-14-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-14-06 **Log By:** M.B. Spancake **Date:** 23-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Borwn silt, trace coarse sand and gravel and trace clay. Some orange/rust colored scale present
0.5'	0.5-1'		0.5'	Brown clayey silt with orange-red scale throughout. Trace sand and gravel
1'	1-1.5'		0.5'	Gray silty clay, some orange-red scale present
1.5'	1.5-2'		0.5'	Gray silty clay, slightly moist
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-15-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-15-06 **Log By:** M.B. Spancake **Date:** 23-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and gravel, brick fragments and fill material
0.5'	0.5-1'		0.5'	Dark brown silt and coarse sand with small gravel and rock
1'	1-1.5'		0.5'	Dark gray silty sand and gravel with brick fragments and fill material
1.5'	1.5-2'		0.5'	Gray green silt with trace clay
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-16-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 92 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-16-06 **Log By:** M.B. Spancake **Date:** 23-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Small gravel and trace medium sand in brown silt matrix
0.5'	0.5-1'		0.5'	Same, changing to gray silt with trace clay at 0.8' BGS
1'	1-1.5'		0.5'	Gray to dark gray clayey silt with lighter gray banding
1.5'	1.5-2'		0.5'	Dark gray silty clay with light gray banding
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-17-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-17-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 2'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown gray silt and coarse sand with gravel and rock with
0.5'	0.5-1'		0.5'	Same as above with brick fragments
1'	1-1.5'		0.5'	Same as above
1.5'	1.5-2'		0.5'	Dark gray stained silt, trace clay. Moist. Changing to a dark gray medium sand at bottom. Wet and stained
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-18-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-18-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and coarse sand with gravel
0.5'	0.5-1'		0.5'	Brownish gray silt and coarse sand with small gravel and fill material
1'	1-1.5'		0.5'	Dark gray silt with trace clay. Coarse sand and gravel present
1.5'	1.5-2'		0.5'	Dark gray stained silt with trace clay and some pebble
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-19-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-19-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown gray silt and coarse sand with small gravel and pebble
0.5'	0.5-1'		0.5'	Same as above with large cobble present
1'	1-1.5'		0.5'	Same as above
1.5'	1.5-2'		0.5'	Dark gray silt, trace gravel and trace clay. Moist
2'				Not Sampled

Aquaterra Technologies, Inc.
Subsurface Log: BH-20-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-20-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt, gravel and coarse sand with large rock and brick fill
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Coarse sand and gravel, moist to wet. Product saturated Refusal at 1.5' BGS
1.5'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-21-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-21-06 **Log By:** M.B. Spancake **Date:** 20-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 2'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and coarse sand with very small gravel
0.5'	0.5-1'		0.5'	Same as above with large rocks and brick fragments
1'	1-1.5'		0.5'	Gray brown medium to coarse sand with some gravel. Moist
1.5'	1.5-2'		0.5'	Same as above with some clay lenses. Moist to wet with product
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-22-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Unit 1732 Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-22-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 2'

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Subangular base stone
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Dark gray silt and trace clay. Cobble and pebble present
1.5'	1.5-2'		0.5'	Tan coarse sand and small gravel. Wet at bottom
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-23-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Unit 1732 Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-23-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Modified 2A base stone
0.5'	0.5-1'		0.5'	Same as above
1'	1-1.5'		0.5'	Black stained silty fine sand, moist to wet at 1.5' BGS
1.5'				Refusal at 1.5' BGS

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-24-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Unit 1732 Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-24-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Subangular base stone
0.5'	0.5-1'		0.5'	Black stained coarse sand and gravel, slightly moist
1'	1-1.5'		0.5'	Same as above, product saturated and wet
1.5'			0.5'	End boring

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-25-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: SWMU 95 Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-25-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Subangular base stone
0.5'	0.5-1'		0.5'	Black stained coarse sand and gravel with small pebbles
1'	1-1.5'		0.5'	Black stained product saturated coarse sand and gravel and pebble. Wet
1.5'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-26-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Tank 797 Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-26-06 **Log By:** M.B. Spancake **Date:** 24-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 1.1" BGS **Backfill:** NA [ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Brown silt and gravel with coarse sand changing to a greenish gray sandy silt and gravel
0.5'	0.5-1'		0.5'	Greenish gray sandy silt and gravel with rock fragments
1'	1-1.1'		0.1'	Refusal at 1.1' BGS. Several other locations attempted with refusal at shallower depths

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-27-06

Project Name: Sunoco Philadelphia Refinery AOI - 6
Location: Tank 1010 Benzene Unit Area
Philadelphia, PA
Boring Number: BH-27-06
Drilling Method: Hand Auger

Owner: Sunoco, Inc. (R&M)
Permit No.: NA

Log By: M.B. Spancake
Sample Method: Hand Auger

Date: 23-Mar-06
Borehole Dia: 3"
Water Level (Init): 1.5'

Construction Details

Total Boring Depth: 2' BGS
Backfill: NA
[ ] = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Tan coarse sand and brown silt
0.5'	0.5-1'		0.5'	Black stained coarse sand and small gravel
1'	1-1.5'		0.5'	Black stained sandy gravel, moist to wet at bottom. Some small cobble
1.5'	1.5-2'		0.5'	Wet gray sandy gravel and small cobble
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-28-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Tank 1010 Benzene Unit Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-28-06 **Log By:** M.B. Spancake **Date:** 23-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 1.5' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Subangular base stone
0.5'	0.5-1'		0.5'	Same, changing to a dark brownish gray silt and gravel with brick fragments
1'	1-1.5'		0.5'	Same as above, refusal at 1.5' BGS
1.5'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: BH-29-06

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Tank 1010 Benzene Unit Area **Permit No.:** NA
Philadelphia, PA
Boring Number: BH-29-06 **Log By:** M.B. Spancake **Date:** 21-Mar-06
Drilling Method: Hand Auger **Sample Method:** Hand Auger **Borehole Dia:** 3"
Water Level (Init): NA

Construction Details

Total Boring Depth: 2' BGS **Backfill:** NA ☐ = Backfill

Completion Details: Backfilled

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology
0	0-0.5'		0.5'	Fill stone and gravel in a brown silt and sand matrix
0.5'	0.5-1'		0.5'	Brown to dark brown silt and sand with gravel. Brick fragmenst and trace clay
1'	1-1.5'		0.5'	Brown to dark gray silt and sand, trace clay with gravel and rock fragments
1.5'	1.5-2'		0.5'	Same as above with brick fragments. Slightly moist with slight staining present
2'				

Note: Highlighted cell indicates soil sample interval submitted for laboratory analysis of non SWMU Site COC's

Aquaterra Technologies, Inc.
Subsurface Log: B-151

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-151 **Log By:** M.B. Spancake **Date:** 23-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 13' (10' bgs) **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0	0.5-1'	NA		Soft dig to 8' BGS Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5					
	8-10'	38.2	1'	Wet sandy gravel changing to a gray clayey silt towards bottom	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-152

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-152 **Log By:** M.B. Spancake **Date:** 27-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 4'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 10' **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flushmount with manhole cover **Sand Pack Type:** #2.

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1.5-2'	466		Advance augers to 8' below ground surface and begin split spoons	
				Wet fill stone at 4' BGS	
5					
	8-10'	NA	1'	Wet gray silty clay	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-153

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-153 **Log By:** M.B. Spancake **Date:** 24-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 10' **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flushmount with manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1.5-2'	0		Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5					
	8-10'	NA	1'	Black stained wet medium to coarse grained sand and gravel changing to a dark gray silty clay at bottom	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-154

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-154 **Log By:** M.B. Spancake **Date:** 23-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 13' (10' bgs) **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0	1-1.5'	NA		Soft dig to 8' BGS Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5	8-10'	NA	2"	Wet medium sand and gravel, gray in color. Rock fragment in shoe of spoon	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-155

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-155 **Log By:** M.B. Spancake **Date:** 24-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 13' (10' bgs) **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1.5-2'	18.2		Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5					
	8-10'	NA	3"	Wet black sandy gravel. Change to a gray clay at bottom of spoon	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 20 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-156

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-156 **Log By:** M.B. Spancake **Date:** 23-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 13' (10' bgs) **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1-1.5'			Advance augers to 8' below ground surface and begin split spoons	
				Wet fill stone at 3' BGS	
5					
	8-10'	NA	2"	Wet black sandy gravel. Change to a brown and gray clay at bottom of spoon	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 20 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-157

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-157 **Log By:** M.B. Spancake **Date:** 22-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 10' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 12' **Backfill:** NA
Screen Interval: 2'-12' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-12' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flushmount with manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1-1.5'	0		Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5					
	8-10'	NA	0	No Recovery	
10	10-12	80.2	0.25'	Wet reddish gray fine sand and poorly sorted gravel, becoming clayey towards bottom End boring at 12' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-158

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-158 **Log By:** M.B. Spancake **Date:** 22-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 10' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 12' **Backfill:** NA
Screen Interval: 2'-12' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-12' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flush mount and manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS Advance augers to 8' BGS and collect spoons Wet fill stone at 3' BGS	
5					
	8'-10'	26.7	0.25'	Wet, medium black sand and coarse gravel.	
10	10-12	77.9	0.25'	Same as above, changing to a gray silty clay at bottom	
				End boring at 12' BGS	

Note: No soil sample collected from this location. Material encountered from 0'-2' was modified 2A fill stone for roadway

Aquaterra Technologies, Inc.
Subsurface Log: B-159

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Unit 231, Philadelphia, PA **Permit No.:**
Boring Number: B-159 **Log By:** M.B. Spancake **Date:** 20-Apr-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Cuttings **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 10' **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: Flushmount with an 8" manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS with backhoe Advance augers to 10' below ground surface and set well Wet modified stone at 3' BGS	
5				Cuttings wet gray sandy gravel	
10				Well set at 10' BGS	

Note: No soil sample collected. Material from 0-2' BGS consisted of modified 2A stone overtop concrete pad

Aquaterra Technologies, Inc.
Subsurface Log: B-160

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-160 **Log By:** M.B. Spancake **Date:** 27-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 4'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 10' **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flushmount with manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS	
	1-1.5'	0		Advance augers to 8' below ground surface and begin split spoons	
				Wet fill stone at 4' BGS	
5					
	8-10'	NA	0.25'	Wet gray silty clay with trace sand	
10				End boring at 10' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-161

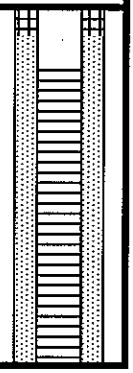
Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-161 **Log By:** M.B. Spancake **Date:** 21-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 10' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 15' (12' bgs) **Backfill:** NA
Screen Interval: 2'-12' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-12' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS via hydroexcavation	
	1.5-2'	25.9		Advance augers to 8' below ground surface and collect spoon Wet modified stone at 3' BGS	
5					
	8-10'		0.25'	Wet, light gray fine sand and large gravel. Staining towards botton of spoon	
10	10-12'		1'	Same as above, gray clay in bottom of spoon	
				End boring at 12' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-162

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-162 **Log By:** M.B. Spancake **Date:** 20-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 13' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Cuttings **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 18' **Backfill:** NA
Screen Interval: 2'-15' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-15' **Bentonite Interval:** 0'-1'
Completion Details: 3' PVC Stick up **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	Amount of Recovery (ft)	Lithology	Well Schematic
0	0'-5'	NA	Soft dig to 8' BGS via hydroexcavation	
	1'-1.5'		Advance augers to 15' and set well	
			Wet modified 2A stone at 3'	
5	5'-10'	NA	Modified 2A stone (backfill from hydroexcavation)	
10	10'-15'	1.25'	Dark gray clayey silt cuttings at 12' bgs.	
15			Well completed at 15' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

Aquaterra Technologies, Inc.
Subsurface Log: B-163

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-163 **Log By:** M.B. Spancake **Date:** 28-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 8' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 2' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 10' **Backfill:** NA
Screen Interval: 2'-10' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-10' **Bentonite Interval:** 0'-1'
Completion Details: 8" Flushmount with manhole cover **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS Advance augers to 8' below ground surface and begin split spoons Wet fill stone at 3' BGS	
5					
	8-10'	NA	0	No recovery	
10				End boring at 10' BGS	

Note: No soil sample collected from this location from the 0-2' interval. Area is paved and or surrounded by modified 2A stone for roadway.

Aquaterra Technologies, Inc.
Subsurface Log: B-164

Project Name: Sunoco Philadelphia Refinery AOI - 6 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: B-164 **Log By:** M.B. Spancake **Date:** 21-Feb-06
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 10' **Slot Size:** 0.020 **Water Level (Init):** 3'
Casing Diameter: 4 inch **Length:** 5' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 15' (12' bgs) **Backfill:** NA
Screen Interval: 2'-12' **Cement/Grout Interval:** NA
Sand Pack Interval: 1'-12' **Bentonite Interval:** 0'-1'
Completion Details: 3' Stick up PVC **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Amount of Recovery (ft)	Lithology	Well Schematic
0				Soft dig to 8' BGS via hydroexcavation	
	1.5-2'	322		Advance augers to 8' below ground surface and collect split spoons Wet fill stone at 3' BGS	
5					
	8'-10'	NA	0	No recovery	
10	10'-12'	NA	0.75	Wet fine gray sand and gravel in top 1" changing to a gray silty clay with organic debris End boring at 12' BGS	

Note: Highlighted cell indicates interval soil sample collected. Soil sample collected with hand auger on 1 March 2006.

APPENDIX C

Soil and Groundwater Analytical Results

Lancaster Laboratories

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared for:

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

610-431-5733

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1001363. Samples arrived at the laboratory on Friday, August 11, 2006. The PO# for this group is SUNOCO PHILLY REFINER.

Client Description	Lancaster Labs Number
B162-081006 Grab Water Sample	4840111
B116-081006 Grab Water Sample	4840112

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks
ELECTRONIC COPY TO	Langan	Attn: Dennis Webster

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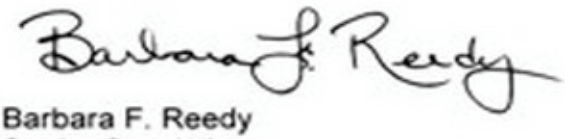
Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,



Barbara F. Reedy
Senior Specialist

Lancaster Laboratories

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Analysis Report

Lancaster Laboratories Sample No. WW 4840111

B162-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:08/10/2006 09:45 by MBS

Account Number: 10132

Submitted: 08/11/2006 17:15
Reported: 08/21/2006 at 08:37
Discard: 09/21/2006

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

B1628

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 25.	25.	3.	ug/l	5
05401	Benzene	71-43-2	< 25.	25.	3.	ug/l	5
05402	1,2-Dichloroethane	107-06-2	< 25.	25.	5.	ug/l	5
05407	Toluene	108-88-3	< 25.	25.	4.	ug/l	5
05415	Ethylbenzene	100-41-4	< 25.	25.	4.	ug/l	5
05420	Isopropylbenzene	98-82-8	< 25.	25.	5.	ug/l	5
06310	Xylene (Total)	1330-20-7	< 25.	25.	4.	ug/l	5

The reporting limits for the GC/MS volatile compounds were raised due to sample foaming.

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4840111

B162-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:08/10/2006 09:45 by MBS

Account Number: 10132

Submitted: 08/11/2006 17:15
Reported: 08/21/2006 at 08:37
Discard: 09/21/2006

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

B1628

06035	Lead	SW-846 6020	1	08/17/2006 22:36	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	08/15/2006 16:19	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	08/17/2006 22:18	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	08/14/2006 21:37	Lauren C Marzario	5
01163	GC/MS VOA Water Prep	SW-846 5030B	1	08/14/2006 21:37	Lauren C Marzario	5
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	08/15/2006 09:50	Megersa Deyessa	1
07786	EDB Extraction	SW-846 8011	1	08/14/2006 19:45	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	08/13/2006 07:45	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4840112

B116-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:08/10/2006 10:00 by MBS

Account Number: 10132

Submitted: 08/11/2006 17:15
Reported: 08/21/2006 at 08:37
Discard: 09/21/2006

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

B1168

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	08/17/2006 22:39	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	08/15/2006 16:50	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	08/17/2006 22:41	William T Parker	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4840112

B116-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:08/10/2006 10:00 by MBS

Account Number: 10132

Submitted: 08/11/2006 17:15
Reported: 08/21/2006 at 08:37
Discard: 09/21/2006

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

B1168

02302	UST-Waters by 8260B	SW-846 8260B	1	08/14/2006 22:00	Lauren C Marzario	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	08/14/2006 22:00	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	08/15/2006 09:50	Megersa Deyessa	1
07786	EDB Extraction	SW-846 8011	1	08/14/2006 19:45	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	08/13/2006 07:45	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 1001363
Reported: 08/21/06 at 08:37 AM

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: 06224WAC026	Sample number(s): 4840111-4840112								
Naphthalene	< 5.	5.	1.	ug/l	84	77	68-108	8	30
Fluorene	< 5.	5.	1.	ug/l	94	84	75-111	11	30
Phenanthrene	< 5.	5.	1.	ug/l	95	88	68-111	7	30
Pyrene	< 5.	5.	1.	ug/l	93	87	68-114	7	30
Chrysene	< 5.	5.	1.	ug/l	89	86	70-111	3	30
Batch number: 062260007A	Sample number(s): 4840111-4840112								
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	108	113	60-140	4	20
Batch number: 062276050002A	Sample number(s): 4840111-4840112								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	102		86-115		
Batch number: T062262AA	Sample number(s): 4840111-4840112								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	109		73-119		
Benzene	< 5.	5.	0.5	ug/l	111		85-117		
1,2-Dichloroethane	< 5.	5.	1.	ug/l	118		77-132		
Toluene	< 5.	5.	0.7	ug/l	96		85-115		
Ethylbenzene	< 5.	5.	0.8	ug/l	91		82-119		
Isopropylbenzene	< 5.	5.	1.	ug/l	94		80-120		
Xylene (Total)	< 5.	5.	0.8	ug/l	94		83-113		

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: 062260007A	Sample number(s): 4840111-4840112 UNSPK: P840118 BKG: P840119								
Ethylene dibromide	48*		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 062276050002A	Sample number(s): 4840111-4840112 UNSPK: P839507 BKG: P839507								
Lead	102	101	78-120	1	20	0.0037	0.0040	6 (1)	20
Batch number: T062262AA	Sample number(s): 4840111-4840112 UNSPK: P837767								
Methyl Tertiary Butyl Ether	101	103	69-127	2	30				
Benzene	113	112	83-128	1	30				
1,2-Dichloroethane	118	117	70-143	1	30				
Toluene	106	106	83-127	1	30				
Ethylbenzene	101	99	82-129	2	30				
Isopropylbenzene	103	104	81-130	1	30				
Xylene (Total)	102	103	82-130	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 background result was more than four times the spike added.

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 1001363
Reported: 08/21/06 at 08:37 AM

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

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: PAHs in Water by GC/MS
Batch number: 06224WAC026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4840111	92	91	92
4840112	90	89	89
Blank	94	92	99
LCS	91	92	96
LCSD	84	84	88
Limits:	51-123	64-112	52-151

Analysis Name: EDB in Wastewater
Batch number: 062260007A

	1,1,2,2-Tetrachloroethane
4840111	67
4840112	72
Blank	102
DUP	57
LCS	112
LCSD	113
MS	44*
Limits:	52-120

Analysis Name: UST-Waters by 8260B
Batch number: T062262AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4840111	93	82	87	89
4840112	94	85	87	90
Blank	94	85	84	90
LCS	92	84	87	95
MS	90	85	90	92
MSD	91	86	91	93
Limits:	80-116	77-113	80-113	78-113

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10132 Group# 1001363 Sample # 4840111-12

COC # 0133945

Please print. Instructions on reverse side correspond with circled numbers. 1.9-4.0°C

(1) Client: Sun- Aquaterra / Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:
Project Manager: B. Spancake / J. Hanna P.O.#:
Sampler: M. B. Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR#: 31864

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	(4) Matrix: Soil	Water	Other	Total # of Containers	(5) Analyses Requested: Preservation Codes — 8260B BTEX, MTBE, Cumene, EDC	8011 EDB	6020 Diss. Pb	8270C Chrysene, Fluorene, Naphthalene, Pyrene, Phenanthrene	(6) Number of containers (optional if preservation noted)
B162-081006	8/10/06	0945	X			X		8	X	X	X	X	
B116-081006	8/10/06	1000	X			X		8	X	X	X	X	

Remarks: Dissolved Pb samples are unfiltered / unpreserved

Please provide Equis EDD

(7) **Turnaround Time Requested** (TAT) (please circle): Normal (Rush)
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: 8/18/06
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg)
Type II (Tier II)
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)
TX TRRP-13
MA MCP CT RCP
SDG Complete? (Yes) No
Site-specific QC (MS/MSD/Dup)? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal COC Required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
Bottle Storage 8/	9/06	7:00	Marwen McFalls	8/9/06	7:00
Marwen McFalls 8/	9/06	9:30	Aquaterra	8/9/06	0930
M. Brad	8/10/06	1630	Aquaterra Fridge	8/10/06	1630
	8/11/06	15:20		8/11/06	10:20
8/11/06		1715		8/11/06	1715

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.

2102.03

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

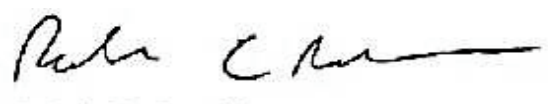
The sample group for this submittal is 992792. Samples arrived at the laboratory on Thursday, Jun 8 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4789401	6/7/2006 12:00	B117-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789402	6/7/2006 12:40	B46-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789403	6/7/2006 12:55	B115-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789404	6/7/2006 13:15	B123-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789405	6/7/2006 13:30	B92-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,



ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

Robin C. Runkle
Senior Specialist

SUN: Aquaterra Tech. Report Date: 6/27/2006 10:06
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/8/2006 17:08
SDG:

Analysis Name	Units	4789401 B117-060			4789402 B46-0607		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	16.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4789403 B115-060			4789404 B123-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	45.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	17.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	7.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	38.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4789405 B92-0607		
		Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0094
Naphthalene	ug/l	< 5.	5.	1.
Fluorene	ug/l	24.	5.	1.
Phenanthrene	ug/l	15.	5.	1.
Pyrene	ug/l	< 5.	5.	1.

** = This limit was used in the evalution of the final result

SUN: Aquaterra Tech. Report Date: 6/27/2006 10:06
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/8/2006 17:08
SDG:

Chrysene	ug/l	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8
Isopropylbenzene	ug/l	7.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4789401	**B117-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1555	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1001	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0308	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 0912	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 0912	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	6/22/06 1933	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/12/06 1540	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/10/06 1145	Mark P Mastropietro	1
4789402	**B46-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1557	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1101	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0401	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 0959	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 0959	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	6/22/06 1933	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/12/06 1540	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/10/06 1145	Mark P Mastropietro	1
4789403	**B115-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1600	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1201	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/16/06 2100	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1023	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1023	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	6/22/06 1933	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/12/06 1540	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4789404	**B123-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1602	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1231	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0453	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1046	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1046	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	6/22/06 1933	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/12/06 1540	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/10/06 1145	Mark P Mastropietro	1
4789405	**B92-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1604	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1302	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0546	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1110	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1110	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	6/22/06 1933	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/12/06 1540	Kerrie A Greenfield	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
07807	BNA Water Extraction	SW-846 3510C	1	6/10/06 1145	Mark P Mastropietro	1

Client Name: SUN: Aquaterra Tech. Group Number: 992792

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 06160WAI026		Sample number(s): 4789401-4789402,4789404-4789405							
Naphthalene	< 5.	5.	1.	ug/l	90	91	70-104	1	30
Fluorene	< 5.	5.	1.	ug/l	98	98	61-116	0	30
Phenanthrene	< 5.	5.	1.	ug/l	90	90	68-111	0	30
Pyrene	< 5.	5.	1.	ug/l	100	96	68-114	4	30
Chrysene	< 5.	5.	1.	ug/l	93	90	70-111	3	30
Batch number: 061630013A		Sample number(s): 4789401-4789405							
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	96	60-140	4	20
Batch number: 06163WAG026		Sample number(s): 4789403							
Naphthalene	< 5.	5.	1.	ug/l	85	90	70-104	5	30
Fluorene	< 5.	5.	1.	ug/l	98	97	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	91	68-111	1	30
Pyrene	< 5.	5.	1.	ug/l	90	95	68-114	5	30
Chrysene	< 5.	5.	1.	ug/l	88	92	70-111	5	30
Batch number: 061736050001A		Sample number(s): 4789401-4789405							
Lead	< 0.0010	0.0010	0.000047	mg/l	101		86-115		
Batch number: T061651AA		Sample number(s): 4789401-4789405							
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	97	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	108	104	85-117	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	107	77-132	0	30
Toluene	< 5.	5.	0.7	ug/l	97	96	85-115	0	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	90	82-119	1	30
Isopropylbenzene	< 5.	5.	1.	ug/l	93	94	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	95	94	83-113	1	30

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

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: 061630013A	Sample number(s): 4789401-4789405 UNSPK: 4789401 BKG: 4789402								
Ethylene dibromide	48*		65-135			< 0.029	< 0.028	0 (1)	30
Batch number: 061736050001A	Sample number(s): 4789401-4789405 UNSPK: P790724 BKG: P790724								
Lead	94	91	78-120	2	20	0.0171	0.0168	2	20
Batch number: T061651AA	Sample number(s): 4789401-4789405 UNSPK: 4789401								
Methyl Tertiary Butyl Ether	99		69-127						
Benzene	112		83-128						
1,2-Dichloroethane	113		70-143						
Toluene	105		83-127						
Ethylbenzene	100		82-129						
Isopropylbenzene	106		81-130						
Xylene (Total)	103		82-130						

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: PAHs in Water by GC/MS
Batch number: 06160WAI026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4789401	90	87	94
4789402	88	91	96
4789404	88	89	93
4789405	88	86	94
Blank	94	91	98
LCS	95	89	104
LCSD	92	90	101
Limits:	51-123	64-112	52-151

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name: EDB in Wastewater
Batch number: 061630013A

	1,1,2,2-Tetrachloroethane
4789401	55
4789402	79
4789403	65
4789404	42*
4789405	33*
Blank	109
DUP	48*
LCS	116
LCSD	107
MS	49*
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06163WAG026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4789403	82	87	94
Blank	84	88	95
LCS	83	92	94
LCSD	86	92	101
Limits:	51-123	64-112	52-151

Analysis Name: UST-Waters by 8260B
Batch number: T061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4789401	90	82	86	88
4789402	87	80	86	88
4789403	88	81	85	86
4789404	89	81	84	90
4789405	88	80	87	91
Blank	90	81	86	88
LCS	88	84	87	88
LCSD	87	83	86	88
MS	87	85	87	92

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Limits:	80-116	77-113	80-113	78-113

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4789401 B117-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789402 B46-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789403 B115-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789404 B123-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789405 B92-060706 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 992976. Samples arrived at the laboratory on Friday, Jun 9 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4790619	6/8/2006 11:50	B45-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790620	6/8/2006 12:05	B158-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790621	6/8/2006 12:35	B48-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790622	6/8/2006 12:20	B48D-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790623	6/8/2006 12:50	B160-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790624	6/8/2006 13:00	B159-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790625	6/8/2006 13:20	B151-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790626	6/8/2006 13:35	B154-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790627	6/8/2006 13:45	B156-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790628	6/8/2006 14:00	B155-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790629	6/8/2006 14:10	B149-060806 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790630	6/9/2006 10:40	B153-060906 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790631	6/9/2006 10:55	B152-060906 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4790632	6/9/2006 11:10	B94-060906 Grab Water Sample

ANALYTICAL RESULTS

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610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

		SUN: Philadelphia Refinery AOI-6
4790633	6/9/2006 8:30	WPM8-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4790634	6/9/2006 9:10	WPM11-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4790635	6/9/2006 10:20	B163-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4790636	6/9/2006 11:25	B145-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4790637	6/9/2006 9:20	WP16-5-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4790638	6/9/2006 13:05	B157-060906 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

SUN: Aquaterra Tech. Report Date: 6/29/2006 14:22
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/9/2006 18:00
SDG:

Analysis Name	Units	4790619 B45-0608			4790620 B158-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0095	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4790621 B48-0608			4790622 B48D-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	6.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4790623 B160-060			4790624 B159-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	9.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.

** = This limit was used in the evalution of the final result

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Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

		4790625			4790626		
Analysis Name	Units	B151-060			B154-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0095	< 0.029	0.029	0.0097
Naphthalene	ug/l	< 5.	5.	1.	76.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	21.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	18.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 1,000.	1,000.	100.
Benzene	ug/l	< 5.	5.	0.5	450,000.	10,000.	1,000.
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 1,000.	1,000.	200.
Toluene	ug/l	< 5.	5.	0.7	6,200.	1,000.	140.
Ethylbenzene	ug/l	< 5.	5.	0.8	< 1,000.	1,000.	160.
Isopropylbenzene	ug/l	< 5.	5.	1.	< 1,000.	1,000.	200.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 1,000.	1,000.	160.

		4790627			4790628		
Analysis Name	Units	B156-060			B155-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	29.	5.	1.
Fluorene	ug/l	16.	5.	1.	10.	5.	1.
Phenanthrene	ug/l	17.	5.	1.	14.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 1,000.	1,000.	100.
Benzene	ug/l	390.	50.	5.	280,000.	10,000.	1,000.
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 1,000.	1,000.	200.
Toluene	ug/l	22.	5.	0.7	< 1,000.	1,000.	140.
Ethylbenzene	ug/l	6.	5.	0.8	< 1,000.	1,000.	160.
Isopropylbenzene	ug/l	84.	5.	1.	< 1,000.	1,000.	200.
Xylene (Total)	ug/l	39.	5.	0.8	< 1,000.	1,000.	160.

		4790629	4790630

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Analysis Name	Units	B149-060			B153-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	7.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 250.	250.	25.	< 5.	5.	0.5
Benzene	ug/l	79,000.	2,500.	250.	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 250.	250.	50.	< 5.	5.	1.
Toluene	ug/l	2,200.	250.	35.	< 5.	5.	0.7
Ethylbenzene	ug/l	< 250.	250.	40.	< 5.	5.	0.8
Isopropylbenzene	ug/l	810.	250.	50.	9.	5.	1.
Xylene (Total)	ug/l	< 250.	250.	40.	< 5.	5.	0.8

Analysis Name	Units	4790631 B152-060			4790632 B94-0609		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	7.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	20.	5.	0.5
Benzene	ug/l	78.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	6.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	94.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4790633 WPM8-060			4790634 WPM11-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0097	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	6.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	14.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	50.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	28.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	23.	5.	0.5	< 5.	5.	0.5

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Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	40.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4790635 B163-060			4790636 B145-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	11.	5.	1.
Fluorene	ug/l	35.	5.	1.	50.	5.	1.
Phenanthrene	ug/l	20.	5.	1.	43.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	12.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 25.	25.	3.	< 5.	5.	0.5
Benzene	ug/l	4,800.	250.	25.	43.	5.	0.5
1,2-Dichloroethane	ug/l	< 25.	25.	5.	< 5.	5.	1.
Toluene	ug/l	< 25.	25.	4.	< 5.	5.	0.7
Ethylbenzene	ug/l	< 25.	25.	4.	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 25.	25.	5.	78.	5.	1.
Xylene (Total)	ug/l	< 25.	25.	4.	11.	5.	0.8

Analysis Name	Units	4790637 WP16-5-0			4790638 B157-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	0.0166	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0098	< 0.029	0.029	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	14.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	25.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	20.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	6.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	66.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	40.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	14.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	6.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	79.	5.	0.8

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CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4790619	**B45-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2032	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1305	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/16/06 2334	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0024	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0024	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4790620	**B158-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2112	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1335	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/17/06 0025	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0048	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0048	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4790621	**B48-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2115	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1435	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/17/06 0116	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0110	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0110	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4790622	**B48D-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2119	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1505	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/17/06 0208	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0134	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0134	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4790623	**B160-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2122	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1535	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/18/06 2102	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0157	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0157	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
07807	BNA Water Extraction	SW-846 3510C	1	6/13/06 0730	Danette S Cavalier	1
4790624	**B159-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2126	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1605	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0931	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0245	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0245	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790625	**B151-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2130	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1636	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0953	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0309	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0309	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790626	**B154-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2133	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1705	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1014	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0332	Kelly E Brickley	200
02302	UST-Waters by 8260B	SW-846 8260B	1	6/15/06 0355	Kelly E Brickley	2000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/15/06 0332	Kelly E Brickley	200
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/15/06 0355	Kelly E Brickley	2000
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790627	**B156-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2137	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1735	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1036	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0318	Nicholas R Rossi	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0342	Nicholas R Rossi	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/17/06 0318	Nicholas R Rossi	1
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/17/06 0342	Nicholas R Rossi	10
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790628	**B155-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2141	David K Beck	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1806	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1504	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0404	Nicholas R Rossi	200
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0427	Nicholas R Rossi	2000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/17/06 0404	Nicholas R Rossi	200
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/17/06 0427	Nicholas R Rossi	2000
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790629	**B149-060806 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2151	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/16/06 1836	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1526	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0450	Nicholas R Rossi	50
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0513	Nicholas R Rossi	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/17/06 0450	Nicholas R Rossi	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/17/06 0513	Nicholas R Rossi	500
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790630	**B153-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2155	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0556	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1547	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/17/06 0536	Nicholas R Rossi	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/17/06 0536	Nicholas R Rossi	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790631	**B152-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2159	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0656	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1609	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1133	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1133	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790632	**B94-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2202	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0756	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1631	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1156	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1156	Seth J Good	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790633	**WPM8-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2206	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0826	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1652	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1220	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1220	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790634	**WPM11-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2209	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0926	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1714	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1307	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1307	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790635	**B163-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2213	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 0956	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1736	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1330	Seth J Good	5
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1354	Seth J Good	50
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1330	Seth J Good	5
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/14/06 1354	Seth J Good	50
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790636	**B145-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/22/06 1241	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 1027	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1757	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1827	Lauren C Marzario	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1827	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/20/06 0115	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790637	**WP16-5-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/22/06 1255	Jayme E Curet	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 1057	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1819	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1914	Lauren C Marzario	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1914	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/20/06 0115	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1
4790638	**B157-060906 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/22/06 1258	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/22/06 1127	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1841	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1938	Lauren C Marzario	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/14/06 1938	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/20/06 0115	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/13/06 1300	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	6/14/06 0800	Joseph S Feister	1

Client Name: SUN: Aquaterra Tech. Group Number: 992976

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 061630032A		Sample number(s): 4790619-4790629							
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	96	60-140	4	20
Batch number: 061630033A		Sample number(s): 4790630-4790638							
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	100	60-140	0	20
Batch number: 06163WAG026		Sample number(s): 4790619-4790623							
Naphthalene	< 5.	5.	1.	ug/l	85	90	70-104	5	30
Fluorene	< 5.	5.	1.	ug/l	98	97	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	91	68-111	1	30
Pyrene	< 5.	5.	1.	ug/l	90	95	68-114	5	30
Chrysene	< 5.	5.	1.	ug/l	88	92	70-111	5	30
Batch number: 06164WAF026		Sample number(s): 4790624-4790638							
Naphthalene	< 5.	5.	1.	ug/l	85	84	70-104	0	30
Fluorene	< 5.	5.	1.	ug/l	88	90	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	92	68-111	0	30
Pyrene	< 5.	5.	1.	ug/l	104	105	68-114	1	30
Chrysene	< 5.	5.	1.	ug/l	91	93	70-111	2	30
Batch number: 061696050001A		Sample number(s): 4790619-4790635							
Lead	< 0.0010	0.0010	0.000047	mg/l	99		86-115		
Batch number: 061716050002A		Sample number(s): 4790636-4790638							
Lead	< 0.0010	0.0010	0.000047	mg/l	102		86-115		
Batch number: N061651AA		Sample number(s): 4790619-4790626							

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	93		73-119		
Benzene	< 5.	5.	0.5	ug/l	92		85-117		
1,2-Dichloroethane	< 5.	5.	1.	ug/l	91		77-132		
Toluene	< 5.	5.	0.7	ug/l	91		85-115		
Ethylbenzene	< 5.	5.	0.8	ug/l	92		82-119		
Isopropylbenzene	< 5.	5.	1.	ug/l	94		80-120		
Xylene (Total)	< 5.	5.	0.8	ug/l	92		83-113		

Batch number: N061671AB Sample number(s): 4790627-4790630

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	113	115	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	102	103	85-117	1	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	126	124	77-132	1	30
Toluene	< 5.	5.	0.7	ug/l	97	98	85-115	2	30
Ethylbenzene	< 5.	5.	0.8	ug/l	99	102	82-119	3	30
Isopropylbenzene	< 5.	5.	1.	ug/l	102	104	80-120	2	30
Xylene (Total)	< 5.	5.	0.8	ug/l	96	99	83-113	3	30

Batch number: T061651AA Sample number(s): 4790631-4790635

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	97	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	108	104	85-117	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	107	77-132	0	30
Toluene	< 5.	5.	0.7	ug/l	97	96	85-115	0	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	90	82-119	1	30
Isopropylbenzene	< 5.	5.	1.	ug/l	93	94	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	95	94	83-113	1	30

Batch number: T061652AA Sample number(s): 4790636-4790638

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	98	97	73-119	0	30
Benzene	< 5.	5.	0.5	ug/l	103	101	85-117	2	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	104	77-132	3	30
Toluene	< 5.	5.	0.7	ug/l	96	95	85-115	1	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	91	82-119	0	30
Isopropylbenzene	< 5.	5.	1.	ug/l	96	95	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	94	94	83-113	1	30

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

	MS	MSD	MS/MSD		RPD	BKG	DUP	DUP	DUP RPD

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name	%REC	%REC	Limits	RPD	MAX	Conc	Conc	RPD	Max
Batch number: 061630032A	Sample number(s): 4790619-4790629 UNSPK: P790442 BKG: P790443								
Ethylene dibromide	87		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 061630033A	Sample number(s): 4790630-4790638 UNSPK: 4790630 BKG: 4790631								
Ethylene dibromide	70		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 061696050001A	Sample number(s): 4790619-4790635 UNSPK: 4790619 BKG: 4790619								
Lead	97	99	78-120	2	20	< 0.0010	< 0.0010	200* (1)	20
Batch number: 061716050002A	Sample number(s): 4790636-4790638 UNSPK: 4790636 BKG: 4790636								
Lead	120	100	78-120	18	20	< 0.0010	< 0.0010	10 (1)	20
Batch number: N061651AA	Sample number(s): 4790619-4790626 UNSPK: P791171								
Methyl Tertiary Butyl Ether	95	100	69-127	5	30				
Benzene	98	104	83-128	6	30				
1,2-Dichloroethane	94	99	70-143	6	30				
Toluene	96	102	83-127	6	30				
Ethylbenzene	97	102	82-129	5	30				
Isopropylbenzene	100	106	81-130	6	30				
Xylene (Total)	96	102	82-130	6	30				
Batch number: N061671AB	Sample number(s): 4790627-4790630 UNSPK: P791697								
Methyl Tertiary Butyl Ether	115		69-127						
Benzene	109		83-128						
1,2-Dichloroethane	128		70-143						
Toluene	102		83-127						
Ethylbenzene	106		82-129						
Isopropylbenzene	108		81-130						
Xylene (Total)	101		82-130						
Batch number: T061651AA	Sample number(s): 4790631-4790635 UNSPK: P789401								
Methyl Tertiary Butyl Ether	99		69-127						
Benzene	112		83-128						

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

1,2-Dichloroethane	113	70-143
Toluene	105	83-127
Ethylbenzene	100	82-129
Isopropylbenzene	106	81-130
Xylene (Total)	103	82-130

Batch number: T061652AA Sample number(s): 4790636-4790638 UNSPK: 4790636

Methyl Tertiary Butyl Ether	98	69-127
Benzene	100	83-128
1,2-Dichloroethane	113	70-143
Toluene	104	83-127
Ethylbenzene	101	82-129
Isopropylbenzene	115	81-130
Xylene (Total)	104	82-130

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: EDB in Wastewater
Batch number: 061630032A

	1,1,2,2-Tetrachloroethane
4790619	87
4790620	68
4790621	91
4790622	91
4790623	94
4790624	97
4790625	33*
4790626	104
4790627	70
4790628	64
4790629	73
Blank	113
DUP	136*
LCS	109
LCSD	113
MS	95
Limits:	52-120

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name: EDB in Wastewater
Batch number: 061630033A

	1,1,2,2-Tetrachloroethane
4790630	87
4790631	92
4790632	126*
4790633	92
4790634	102
4790635	168*
4790636	74
4790637	112
4790638	88
Blank	118
DUP	100
LCS	116
LCSD	120
MS	77
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06163WAG026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4790619	85	89	94
4790620	81	83	91
4790621	85	90	95
4790622	88	92	95
4790623	85	85	83
Blank	84	88	95
LCS	83	92	94
LCSD	86	92	101
Limits:	51-123	64-112	52-151

Analysis Name: PAHs in Water by GC/MS
Batch number: 06164WAF026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4790624	93	89	99
4790625	97	91	100
4790626	99	85	97

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

4790627	98	92	100
4790628	92	88	99
4790629	95	90	97
4790630	98	93	102
4790631	99	84	103
4790632	96	91	98
4790633	91	77	97
4790634	93	85	94
4790635	95	91	98
4790636	92	88	96
4790637	97	88	96
4790638	91	80	65
Blank	98	89	102
LCS	100	92	110
LCSD	100	91	111
Limits:	51-123	64-112	52-151

Analysis Name: UST-Waters by 8260B
Batch number: N061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790619	96	98	97	96
4790620	97	97	97	98
4790621	96	97	96	97
4790622	96	98	97	96
4790623	96	98	96	96
4790624	95	97	97	99
4790625	96	97	98	99
4790626	93	94	97	96
Blank	96	98	96	95
LCS	96	99	98	99
MS	97	98	98	100
MSD	97	98	97	99
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: N061671AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790627	101	96	100	106
4790628	99	96	99	100

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

4790629	99	96	98	104
4790630	101	97	101	106
Blank	103	100	99	101
LCS	103	99	99	108
LCSD	102	95	101	109
MS	101	96	99	108
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: T061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790631	88	80	91	92
4790632	88	82	85	88
4790633	88	81	86	91
4790634	88	81	85	87
4790635	87	84	85	88
Blank	90	81	86	88
LCS	88	84	87	88
LCSD	87	83	86	88
MS	87	85	87	92
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: T061652AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790636	87	84	87	90
4790637	87	82	87	89
4790638	87	81	86	90
Blank	89	83	85	88
LCS	89	83	86	90
LCSD	87	84	86	88
MS	88	85	89	92
Limits:	80-116	77-113	80-113	78-113

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4790619 B45-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790620 B158-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790621 B48-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790622 B48D-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790623 B160-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790624 B159-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790625 B151-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790626 B154-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790627 B156-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790628 B155-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790629 B149-060806 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790630 B153-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790631 B152-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790632 B94-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790633 WPM8-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790634 WPM11-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790635 B163-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790636 B145-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037

This sample was filtered in the lab for dissolved metals.

4790637 WP16-5-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4790638 B157-060906 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

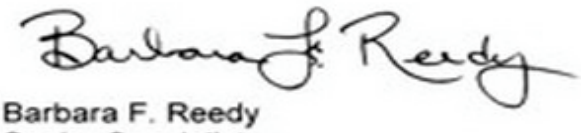
The sample group for this submittal is 1001363. Samples arrived at the laboratory on Friday, Aug 11 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4840111	8/10/2006 9:45	B162-081006 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4840112	8/10/2006 10:00	B116-081006 Grab Water Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks
ELECTRONIC COPY TO	Langan	Attn: Dennis Webster

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,



Barbara F. Reedy
Senior Specialist

SUN: Aquaterra Tech. Report Date: 8/21/2006 8:37
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 8/11/2006 17:15
SDG:

Analysis Name	Units	4840111 B162-081			4840112 B116-081		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0094	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 25.	25.	3.	< 5.	5.	0.5
Benzene	ug/l	< 25.	25.	3.	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 25.	25.	5.	< 5.	5.	1.
Toluene	ug/l	< 25.	25.	4.	< 5.	5.	0.7
Ethylbenzene	ug/l	< 25.	25.	4.	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 25.	25.	5.	< 5.	5.	1.
Xylene (Total)	ug/l	< 25.	25.	4.	< 5.	5.	0.8

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4840111	**B162-081006 Grab Water Sample**					
06035	Lead	SW-846 6020	1	8/17/06 2236	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	8/15/06 1619	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	8/17/06 2218	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	8/14/06 2137	Lauren C Marzario	5
01163	GC/MS VOA Water Prep	SW-846 5030B	1	8/14/06 2137	Lauren C Marzario	5
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	8/15/06 0950	Megersa Deyessa	1
07786	EDB Extraction	SW-846 8011	1	8/14/06 1945	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	8/13/06 0745	Joseph S Feister	1
4840112	**B116-081006 Grab Water Sample**					
06035	Lead	SW-846 6020	1	8/17/06 2239	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	8/15/06 1650	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	8/17/06 2241	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	8/14/06 2200	Lauren C Marzario	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	8/14/06 2200	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	8/15/06 0950	Megersa Deyessa	1
07786	EDB Extraction	SW-846 8011	1	8/14/06 1945	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	8/13/06 0745	Joseph S Feister	1

Client Name: SUN: Aquaterra Tech. Group Number: 1001363

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 06224WAC026		Sample number(s): 4840111-4840112							
Naphthalene	< 5.	5.	1.	ug/l	84	77	68-108	8	30
Fluorene	< 5.	5.	1.	ug/l	94	84	75-111	11	30
Phenanthrene	< 5.	5.	1.	ug/l	95	88	68-111	7	30
Pyrene	< 5.	5.	1.	ug/l	93	87	68-114	7	30
Chrysene	< 5.	5.	1.	ug/l	89	86	70-111	3	30
Batch number: 062260007A		Sample number(s): 4840111-4840112							
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	108	113	60-140	4	20
Batch number: 062276050002A		Sample number(s): 4840111-4840112							
Lead	< 0.0010	0.0010	0.000047	mg/l	102		86-115		
Batch number: T062262AA		Sample number(s): 4840111-4840112							
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	109		73-119		
Benzene	< 5.	5.	0.5	ug/l	111		85-117		
1,2-Dichloroethane	< 5.	5.	1.	ug/l	118		77-132		
Toluene	< 5.	5.	0.7	ug/l	96		85-115		
Ethylbenzene	< 5.	5.	0.8	ug/l	91		82-119		
Isopropylbenzene	< 5.	5.	1.	ug/l	94		80-120		
Xylene (Total)	< 5.	5.	0.8	ug/l	94		83-113		

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: 062260007A	Sample number(s): 4840111-4840112 UNSPK: P840118 BKG: P840119								

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Ethylene dibromide	48*		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 062276050002A	Sample number(s): 4840111-4840112 UNSPK: P839507 BKG: P839507								
Lead	102	101	78-120	1	20	0.0037	0.0040	6 (1)	20
Batch number: T062262AA	Sample number(s): 4840111-4840112 UNSPK: P837767								
Methyl Tertiary Butyl Ether	101	103	69-127	2	30				
Benzene	113	112	83-128	1	30				
1,2-Dichloroethane	118	117	70-143	1	30				
Toluene	106	106	83-127	1	30				
Ethylbenzene	101	99	82-129	2	30				
Isopropylbenzene	103	104	81-130	1	30				
Xylene (Total)	102	103	82-130	1	30				

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: PAHs in Water by GC/MS
Batch number: 06224WAC026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4840111	92	91	92
4840112	90	89	89
Blank	94	92	99
LCS	91	92	96
LCSD	84	84	88
Limits:	51-123	64-112	52-151

Analysis Name: EDB in Wastewater
Batch number: 062260007A

	1,1,2,2-Tetrachloroethane
4840111	67
4840112	72
Blank	102
DUP	57
LCS	112

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

LCSD	113
MS	44*
Limits:	52-120

Analysis Name: UST-Waters by 8260B
Batch number: T062262AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4840111	93	82	87	89
4840112	94	85	87	90
Blank	94	85	84	90
LCS	92	84	87	95
MS	90	85	90	92
MSD	91	86	91	93
Limits:	80-116	77-113	80-113	78-113

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4840111 B162-081006 Grab Water Sample

02302 UST-Waters by 8260B
The reporting limits for the GC/MS volatile compounds were raised due to sample foaming.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4840112 B116-081006 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Partial Report

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lanacaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 1001363. Samples arrived at the laboratory on Friday, Aug 11 2006.
The project for this group is SUN: Philadelphia Refinery AOI-1.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4840111	8/10/2006 9:45	B162-081006 Grab Water Sample SUN: Philadelphia Refinery AOI-1
4840112	8/10/2006 10:00	B116-081006 Grab Water Sample SUN: Philadelphia Refinery AOI-1

0 COPIES TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
0 COPIES TO	Langan	Attn: Jason Hanna
0 COPIES TO	Langan	Attn: Joseph Catricks
0 COPIES TO	Langan	Attn: Dennis Webster

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Partial Report

Lancaster Laboratories

Analytical Report

SUN: Aquaterra Tech.
Project: SUN: Philadelphia Refinery AOI-1

Report Date: 8/18/2006 16:02
Submit Date: 8/11/2006 17:15

Analysis Name	Units	4840111 B162-081			4840112 B116-081		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0094	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 25.	25.	3.	< 5.	5.	0.5
Benzene	ug/l	< 25.	25.	3.	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 25.	25.	5.	< 5.	5.	1.
Toluene	ug/l	< 25.	25.	4.	< 5.	5.	0.7
Ethylbenzene	ug/l	< 25.	25.	4.	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 25.	25.	5.	< 5.	5.	1.
Xylene (Total)	ug/l	< 25.	25.	4.	< 5.	5.	0.8

Partial Report

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4840111	**B162-081006 Grab Water Sample**					
06035	Lead	SW-846 6020	1	8/17/06 2236	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	8/15/06 1619	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	8/17/06 2218	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	8/14/06 2137	Lauren C Marzario	5
4840112	**B116-081006 Grab Water Sample**					
06035	Lead	SW-846 6020	1	8/17/06 2239	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	8/15/06 1650	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	8/17/06 2241	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	8/14/06 2200	Lauren C Marzario	1

Comments

4840111 B162-081006 Grab Water Sample

02302 UST-Waters by 8260B
The reporting limits for the GC/MS volatile compounds were raised due to sample foaming.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4840112 B116-081006 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4840111

Account: 10132

B162-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-1

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

Collected: 08/10/2006 09:45 by MBS
Submitted: 08/11/2006 17:15
Reported: 08/18/2006 at 16:03
B1628

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 25.	25.	3.	ug/l	5
05401	Benzene	71-43-2	< 25.	25.	3.	ug/l	5
05402	1,2-Dichloroethane	107-06-2	< 25.	25.	5.	ug/l	5
05407	Toluene	108-88-3	< 25.	25.	4.	ug/l	5
05415	Ethylbenzene	100-41-4	< 25.	25.	4.	ug/l	5
05420	Isopropylbenzene	98-82-8	< 25.	25.	5.	ug/l	5
06310	Xylene (Total)	1330-20-7	< 25.	25.	4.	ug/l	5

The reporting limits for the GC/MS volatile compounds were raised due to sample foaming.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	08/17/2006 22:36	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	08/15/2006 16:19	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	08/17/2006 22:18	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	08/14/2006 21:37	Lauren C Marzario	5

Sample Number: WW 4840112

Account: 10132

B116-081006 Grab Water Sample
SUN: Philadelphia Refinery AOI-1

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

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4840112

Collected: 08/10/2006 10:00 by MBS
Submitted: 08/11/2006 17:15
Reported: 08/18/2006 at 16:03
B1168

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	08/17/2006 22:39	John P Hook	1
07879	EDB in Wastewater	SW-846 8011	1	08/15/2006 16:50	Richard A Shober	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	08/17/2006 22:41	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	08/14/2006 22:00	Lauren C Marzario	1

*This limit was used to evaluate the final result

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Partial Report

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lanacaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 992792. Samples arrived at the laboratory on Thursday, Jun 8 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4789401	6/7/2006 12:00	B117-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789402	6/7/2006 12:40	B46-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789403	6/7/2006 12:55	B115-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789404	6/7/2006 13:15	B123-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789405	6/7/2006 13:30	B92-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6

0 COPIES TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
0 COPIES TO	Langan	Attn: Jason Hanna
0 COPIES TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Analytical Report

SUN: Aquaterra Tech.
Project: SUN: Philadelphia Refinery AOI-6

Report Date: 6/22/2006 16:41
Submit Date: 6/8/2006 17:08

Analysis Name	Units	4789401 B117-060			4789402 B46-0607		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	16.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4789403 B115-060			4789404 B123-060		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	45.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	17.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	7.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	38.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4789405 B92-0607		
		Result	LOQ*	MDL
Ethylene dibromide	ug/l	n.a.	n.a.	
Naphthalene	ug/l	< 5.	5.	1.
Fluorene	ug/l	24.	5.	1.
Phenanthrene	ug/l	15.	5.	1.
Pyrene	ug/l	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8

Analytical Report

SUN: Aquaterra Tech. Report Date: 6/22/2006 16:41
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/8/2006 17:08

Isopropylbenzene	ug/l	7.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8

Partial Report

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4789401	**B117-060706 Grab Water Sample**					
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1001	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0308	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 0912	Seth J Good	1
4789402	**B46-060706 Grab Water Sample**					
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1101	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0401	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 0959	Seth J Good	1
4789403	**B115-060706 Grab Water Sample**					
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1201	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/16/06 2100	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1023	Seth J Good	1
4789404	**B123-060706 Grab Water Sample**					
07879	EDB in Wastewater	SW-846 8011	1	6/13/06 1231	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0453	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1046	Seth J Good	1
4789405	**B92-060706 Grab Water Sample**					
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 0546	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/14/06 1110	Seth J Good	1

Comments

4789401 B117-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789402 B46-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789403 B115-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789404 B123-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789405 B92-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789401

Account: 10132

B117-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:00 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/22/2006 at 16:41
11706

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	16.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 10:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 03:08	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 09:12	Seth J Good	1

Sample Number: WW 4789402

Account: 10132

B46-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:40 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/22/2006 at 16:41
B4606

				As Received	As Received

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789402

CAT No.	Analysis Name	CAS Number	As Received Result	Limit of Quantitation*	Method Detection Limit	Units	Dilution Factor
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 11:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 04:01	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 09:59	Seth J Good	1

Sample Number: WW 4789403

Account: 10132

B115-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:55 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/22/2006 at 16:41
B1156

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789403

03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 12:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/16/2006 21:00	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 10:23	Seth J Good	1

Sample Number: WW 4789404

Account: 10132

B123-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 13:15 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/22/2006 at 16:41
B1236

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	45.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	17.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	7.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789404

05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	38.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 12:31	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 04:53	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 10:46	Seth J Good	1

Sample Number: WW 4789405

Account: 10132

B92-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 13:30 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/22/2006 at 16:41
B9206

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	24.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	15.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	7.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 05:46	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 11:10	Seth J Good	1

*This limit was used to evaluate the final result

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Partial Report

ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lanacaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 992792. Samples arrived at the laboratory on Thursday, Jun 8 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4789401	6/7/2006 12:00	B117-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789402	6/7/2006 12:40	B46-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789403	6/7/2006 12:55	B115-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789404	6/7/2006 13:15	B123-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4789405	6/7/2006 13:30	B92-060706 Grab Water Sample SUN: Philadelphia Refinery AOI-6

0 COPIES TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
0 COPIES TO	Langan	Attn: Jason Hanna
0 COPIES TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Partial Report

Lancaster Laboratories

Analytical Report

SUN: Aquaterra Tech.
Project: SUN: Philadelphia Refinery AOI-6

Report Date: 6/26/2006 16:39
Submit Date: 6/8/2006 17:08

Analysis Name	Units	4789401 B117-060			4789402 B46-0607		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047

Analysis Name	Units	4789403 B115-060			4789404 B123-060		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047

Analysis Name	Units	4789405 B92-0607		
		Result	LOQ*	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047

Partial Report

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4789401	**B117-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1555	Jayme E Curet	1
4789402	**B46-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1557	Jayme E Curet	1
4789403	**B115-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1600	Jayme E Curet	1
4789404	**B123-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1602	Jayme E Curet	1
4789405	**B92-060706 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/23/06 1604	Jayme E Curet	1

Comments

4789401 B117-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789402 B46-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789403 B115-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789404 B123-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

4789405 B92-060706 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789401

Account: 10132

B117-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:00 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/26/2006 at 16:39
11706

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 15:55	Jayme E Curet	1

Sample Number: WW 4789402

Account: 10132

B46-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:40 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/26/2006 at 16:39
B4606

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 15:57	Jayme E Curet	1

Sample Number: WW 4789403

Account: 10132

B115-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 12:55 by MBS

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789403

Submitted: 06/08/2006 17:08
Reported: 06/26/2006 at 16:39
B1156

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:00	Jayme E Curet	1

Sample Number: WW 4789404

Account: 10132

B123-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 13:15 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/26/2006 at 16:39
B1236

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:02	Jayme E Curet	1

Sample Number: WW 4789405

Account: 10132

B92-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

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

Collected: 06/07/2006 13:30 by MBS
Submitted: 06/08/2006 17:08
Reported: 06/26/2006 at 16:39
B9206

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: WW 4789405

06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.
Trip blank vials were not received by the laboratory for this sample group.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:04	Jayme E Curet	1

*This limit was used to evaluate the final result

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

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

610-431-5733

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 992976. Samples arrived at the laboratory on Friday, June 09, 2006. The PO# for this group is SUNOCO PHILLY REFINER.

Client Description	Lancaster Labs Number
B45-060806 Grab Water Sample	4790619
B158-060806 Grab Water Sample	4790620
B48-060806 Grab Water Sample	4790621
B48D-060806 Grab Water Sample	4790622
B160-060806 Grab Water Sample	4790623
B159-060806 Grab Water Sample	4790624
B151-060806 Grab Water Sample	4790625
B154-060806 Grab Water Sample	4790626
B156-060806 Grab Water Sample	4790627
B155-060806 Grab Water Sample	4790628
B149-060806 Grab Water Sample	4790629
B153-060906 Grab Water Sample	4790630
B152-060906 Grab Water Sample	4790631
B94-060906 Grab Water Sample	4790632
WPM8-060906 Grab Water Sample	4790633
WPM11-060906 Grab Water Sample	4790634
B163-060906 Grab Water Sample	4790635
B145-060906 Grab Water Sample	4790636
WP16-5-060906 Grab Water Sample	4790637
B157-060906 Grab Water Sample	4790638

ELECTRONIC SUN: Aquaterra Tech. Attn: Brad Spancake

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Analysis Report

COPY TO
ELECTRONIC Langan Attn: Jason Hanna
COPY TO
ELECTRONIC Langan Attn: Joseph Catricks
COPY TO

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790619

B45-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 11:50 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B45--

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 20:32	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 13:05	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/16/2006 23:34	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 00:24	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790619

B45-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 11:50 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B45--

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 00:24	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790620

B158-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:05 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B158-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:12	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 13:35	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/17/2006 00:25	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 00:48	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790620

B158-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:05 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B158-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 00:48	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790621

B48-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:35 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B48--

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	6.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:15	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 14:35	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/17/2006 01:16	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 01:10	Kelly E Brickley	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790621

B48-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:35 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B48--

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 01:10	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790622

B48D-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B48D-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:19	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 15:05	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/17/2006 02:08	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 01:34	Kelly E Brickley	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790622

B48D-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B48D-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 01:34	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790623

B160-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:50 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B160-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:22	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 15:35	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/18/2006 21:02	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 01:57	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790623

B160-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 12:50 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B160-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 01:57	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790624

B159-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:00 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B159-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	9.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:26	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 16:05	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 09:31	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 02:45	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790624

B159-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:00 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B159-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 02:45	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790625

B151-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B151-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:30	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 16:36	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 09:53	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 03:09	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790625

B151-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B151-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 03:09	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790626

B154-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:35 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

-B154

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0097	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	76.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	21.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	18.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 1,000.	1,000.	100.	ug/l	200
05401	Benzene	71-43-2	450,000.	10,000.	1,000.	ug/l	2000
05402	1,2-Dichloroethane	107-06-2	< 1,000.	1,000.	200.	ug/l	200
05407	Toluene	108-88-3	6,200.	1,000.	140.	ug/l	200
05415	Ethylbenzene	100-41-4	< 1,000.	1,000.	160.	ug/l	200
05420	Isopropylbenzene	98-82-8	< 1,000.	1,000.	200.	ug/l	200
06310	Xylene (Total)	1330-20-7	< 1,000.	1,000.	160.	ug/l	200

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:33	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 17:05	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 10:14	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 03:32	Kelly E Brickley	200

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790626

B154-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:35 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

-B154

02302	UST-Waters by 8260B	SW-846 8260B	1	06/15/2006 03:55	Kelly E Brickley	2000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/15/2006 03:32	Kelly E Brickley	200
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/15/2006 03:55	Kelly E Brickley	2000
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790627

B156-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:45 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B156-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	16.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	17.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	390.	50.	5.	ug/l	10
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	22.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	6.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	84.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	39.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:37	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 17:35	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 10:36	Mark A Clark	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 03:18	Nicholas R Rossi	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790627

B156-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 13:45 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B156-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 03:42	Nicholas R Rossi	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/17/2006 03:18	Nicholas R Rossi	1
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/17/2006 03:42	Nicholas R Rossi	10
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790628

B155-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 14:00 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B155-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	29.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	10.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	14.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 1,000.	1,000.	100.	ug/l	200
05401	Benzene	71-43-2	280,000.	10,000.	1,000.	ug/l	2000
05402	1,2-Dichloroethane	107-06-2	< 1,000.	1,000.	200.	ug/l	200
05407	Toluene	108-88-3	< 1,000.	1,000.	140.	ug/l	200
05415	Ethylbenzene	100-41-4	< 1,000.	1,000.	160.	ug/l	200
05420	Isopropylbenzene	98-82-8	< 1,000.	1,000.	200.	ug/l	200
06310	Xylene (Total)	1330-20-7	< 1,000.	1,000.	160.	ug/l	200

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:41	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 18:06	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 15:04	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 04:04	Nicholas R Rossi	200

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790628

B155-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 14:00 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B155-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 04:27	Nicholas R Rossi	2000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/17/2006 04:04	Nicholas R Rossi	200
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/17/2006 04:27	Nicholas R Rossi	2000
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790629

B149-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 14:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B149-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	7.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 250.	250.	25.	ug/l	50
05401	Benzene	71-43-2	79,000.	2,500.	250.	ug/l	500
05402	1,2-Dichloroethane	107-06-2	< 250.	250.	50.	ug/l	50
05407	Toluene	108-88-3	2,200.	250.	35.	ug/l	50
05415	Ethylbenzene	100-41-4	< 250.	250.	40.	ug/l	50
05420	Isopropylbenzene	98-82-8	810.	250.	50.	ug/l	50
06310	Xylene (Total)	1330-20-7	< 250.	250.	40.	ug/l	50

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:51	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/16/2006 18:36	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 15:26	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 04:50	Nicholas R Rossi	50

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Analysis Report

Lancaster Laboratories Sample No. WW 4790629

B149-060806 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/08/2006 14:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B149-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 05:13	Nicholas R Rossi	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/17/2006 04:50	Nicholas R Rossi	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/17/2006 05:13	Nicholas R Rossi	500
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790630

B153-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:40 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B153-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	9.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:55	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 05:56	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 15:47	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/17/2006 05:36	Nicholas R Rossi	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790630

B153-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:40 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B153-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/17/2006 05:36	Nicholas R Rossi	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790631

B152-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:55 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B152-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	7.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	78.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	6.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	94.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 21:59	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 06:56	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 16:09	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 11:33	Seth J Good	1

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Analysis Report

Lancaster Laboratories Sample No. WW 4790631

B152-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:55 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

SUN: Aquaterra Tech.
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B152-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 11:33	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790632

B94-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 11:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

SUN: Aquaterra Tech.
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West Chester PA 19381

B94--

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	20.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 22:02	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 07:56	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 16:31	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 11:56	Seth J Good	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790632

B94-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 11:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B94--

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 11:56	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790633

WPM8-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 08:30 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WPM8-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0097	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	23.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	40.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 22:06	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 08:26	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 16:52	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 12:20	Seth J Good	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790633

WPM8-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 08:30 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WPM8-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 12:20	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790634

WPM11-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 09:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WPM11

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	6.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	14.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	50.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	28.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 22:09	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 09:26	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 17:14	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 13:07	Seth J Good	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790634

WPM11-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 09:10 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WPM11

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 13:07	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790635

B163-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B163-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	35.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	20.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 25.	25.	3.	ug/l	5
05401	Benzene	71-43-2	4,800.	250.	25.	ug/l	50
05402	1,2-Dichloroethane	107-06-2	< 25.	25.	5.	ug/l	5
05407	Toluene	108-88-3	< 25.	25.	4.	ug/l	5
05415	Ethylbenzene	100-41-4	< 25.	25.	4.	ug/l	5
05420	Isopropylbenzene	98-82-8	< 25.	25.	5.	ug/l	5
06310	Xylene (Total)	1330-20-7	< 25.	25.	4.	ug/l	5

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 22:13	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 09:56	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 17:36	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 13:30	Seth J Good	5

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790635

B163-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 10:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B163-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 13:54	Seth J Good	50
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 13:30	Seth J Good	5
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/14/2006 13:54	Seth J Good	50
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790636

B145-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 11:25 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B145-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	11.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	50.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	43.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	12.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	43.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	78.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	11.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/22/2006 12:41	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 10:27	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 17:57	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 18:27	Lauren C Marzario	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790636

B145-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 11:25 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B145-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 18:27	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/20/2006 01:15	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790637

WP16-5-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 09:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WP165

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0098	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/22/2006 12:55	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 10:57	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 18:19	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 19:14	Lauren C Marzario	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790637

WP16-5-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 09:20 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

WP165

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 19:14	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/20/2006 01:15	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4790638

B157-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 13:05 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B157-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	0.0166	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	14.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	25.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	20.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	6.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	66.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	40.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	14.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	6.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	79.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/22/2006 12:58	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/22/2006 11:27	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 18:41	Linda M Hartenstine	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 19:38	Lauren C Marzario	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4790638

B157-060906 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/09/2006 13:05 by MBS

Account Number: 10132

Submitted: 06/09/2006 18:00
Reported: 06/29/2006 at 14:21
Discard: 07/30/2006

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

B157-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 19:38	Lauren C Marzario	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/20/2006 01:15	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/13/2006 13:00	Deborah M Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	06/14/2006 08:00	Joseph S Feister	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 PM

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: 061630032A	Sample number(s): 4790619-4790629								
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	96	60-140	4	20
Batch number: 061630033A	Sample number(s): 4790630-4790638								
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	100	60-140	0	20
Batch number: 06163WAG026	Sample number(s): 4790619-4790623								
Naphthalene	< 5.	5.	1.	ug/l	85	90	70-104	5	30
Fluorene	< 5.	5.	1.	ug/l	98	97	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	91	68-111	1	30
Pyrene	< 5.	5.	1.	ug/l	90	95	68-114	5	30
Chrysene	< 5.	5.	1.	ug/l	88	92	70-111	5	30
Batch number: 06164WAF026	Sample number(s): 4790624-4790638								
Naphthalene	< 5.	5.	1.	ug/l	85	84	70-104	0	30
Fluorene	< 5.	5.	1.	ug/l	88	90	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	92	68-111	0	30
Pyrene	< 5.	5.	1.	ug/l	104	105	68-114	1	30
Chrysene	< 5.	5.	1.	ug/l	91	93	70-111	2	30
Batch number: 061696050001A	Sample number(s): 4790619-4790635								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	99		86-115		
Batch number: 061716050002A	Sample number(s): 4790636-4790638								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	102		86-115		
Batch number: N061651AA	Sample number(s): 4790619-4790626								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	93		73-119		
Benzene	< 5.	5.	0.5	ug/l	92		85-117		
1,2-Dichloroethane	< 5.	5.	1.	ug/l	91		77-132		
Toluene	< 5.	5.	0.7	ug/l	91		85-115		
Ethylbenzene	< 5.	5.	0.8	ug/l	92		82-119		
Isopropylbenzene	< 5.	5.	1.	ug/l	94		80-120		
Xylene (Total)	< 5.	5.	0.8	ug/l	92		83-113		
Batch number: N061671AB	Sample number(s): 4790627-4790630								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	113	115	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	102	103	85-117	1	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	126	124	77-132	1	30
Toluene	< 5.	5.	0.7	ug/l	97	98	85-115	2	30
Ethylbenzene	< 5.	5.	0.8	ug/l	99	102	82-119	3	30
Isopropylbenzene	< 5.	5.	1.	ug/l	102	104	80-120	2	30
Xylene (Total)	< 5.	5.	0.8	ug/l	96	99	83-113	3	30
Batch number: T061651AA	Sample number(s): 4790631-4790635								

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 PM

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	97	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	108	104	85-117	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	107	77-132	0	30
Toluene	< 5.	5.	0.7	ug/l	97	96	85-115	0	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	90	82-119	1	30
Isopropylbenzene	< 5.	5.	1.	ug/l	93	94	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	95	94	83-113	1	30
Batch number: T061652AA	Sample number(s): 4790636-4790638								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	98	97	73-119	0	30
Benzene	< 5.	5.	0.5	ug/l	103	101	85-117	2	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	104	77-132	3	30
Toluene	< 5.	5.	0.7	ug/l	96	95	85-115	1	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	91	82-119	0	30
Isopropylbenzene	< 5.	5.	1.	ug/l	96	95	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	94	94	83-113	1	30

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: 061630032A	Sample number(s): 4790619-4790629 UNSPK: P790442 BKG: P790443								
Ethylene dibromide	87		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 061630033A	Sample number(s): 4790630-4790638 UNSPK: 4790630 BKG: 4790631								
Ethylene dibromide	70		65-135			< 0.029	< 0.029	0 (1)	30
Batch number: 061696050001A	Sample number(s): 4790619-4790635 UNSPK: 4790619 BKG: 4790619								
Lead	97	99	78-120	2	20	< 0.0010	< 0.0010	200* (1)	20
Batch number: 061716050002A	Sample number(s): 4790636-4790638 UNSPK: 4790636 BKG: 4790636								
Lead	120	100	78-120	18	20	< 0.0010	< 0.0010	10 (1)	20
Batch number: N061651AA	Sample number(s): 4790619-4790626 UNSPK: P791171								
Methyl Tertiary Butyl Ether	95	100	69-127	5	30				
Benzene	98	104	83-128	6	30				
1,2-Dichloroethane	94	99	70-143	6	30				
Toluene	96	102	83-127	6	30				
Ethylbenzene	97	102	82-129	5	30				
Isopropylbenzene	100	106	81-130	6	30				
Xylene (Total)	96	102	82-130	6	30				
Batch number: N061671AB	Sample number(s): 4790627-4790630 UNSPK: P791697								
Methyl Tertiary Butyl Ether	115		69-127						
Benzene	109		83-128						
1,2-Dichloroethane	128		70-143						
Toluene	102		83-127						
Ethylbenzene	106		82-129						
Isopropylbenzene	108		81-130						

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 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

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Xylene (Total)	101		82-130						
Batch number: T061651AA	Sample number(s): 4790631-4790635 UNSPK: P789401								
Methyl Tertiary Butyl Ether	99		69-127						
Benzene	112		83-128						
1,2-Dichloroethane	113		70-143						
Toluene	105		83-127						
Ethylbenzene	100		82-129						
Isopropylbenzene	106		81-130						
Xylene (Total)	103		82-130						
Batch number: T061652AA	Sample number(s): 4790636-4790638 UNSPK: 4790636								
Methyl Tertiary Butyl Ether	98		69-127						
Benzene	100		83-128						
1,2-Dichloroethane	113		70-143						
Toluene	104		83-127						
Ethylbenzene	101		82-129						
Isopropylbenzene	115		81-130						
Xylene (Total)	104		82-130						

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: EDB in Wastewater
Batch number: 061630032A

	1,1,2,2-Tetrachloroethane
4790619	87
4790620	68
4790621	91
4790622	91
4790623	94
4790624	97
4790625	33*
4790626	104
4790627	70
4790628	64
4790629	73
Blank	113
DUP	136*
LCS	109
LCSD	113
MS	95
Limits:	52-120

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 PM

Surrogate Quality Control

Analysis Name: EDB in Wastewater
Batch number: 061630033A

	1,1,2,2-Tetrachloroethane
4790630	87
4790631	92
4790632	126*
4790633	92
4790634	102
4790635	168*
4790636	74
4790637	112
4790638	88
Blank	118
DUP	100
LCS	116
LCSD	120
MS	77
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06163WAG026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4790619	85	89	94
4790620	81	83	91
4790621	85	90	95
4790622	88	92	95
4790623	85	85	83
Blank	84	88	95
LCS	83	92	94
LCSD	86	92	101
Limits:	51-123	64-112	52-151

Analysis Name: PAHs in Water by GC/MS
Batch number: 06164WAF026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4790624	93	89	99
4790625	97	91	100
4790626	99	85	97
4790627	98	92	100
4790628	92	88	99
4790629	95	90	97
4790630	98	93	102
4790631	99	84	103
4790632	96	91	98
4790633	91	77	97
4790634	93	85	94
4790635	95	91	98
4790636	92	88	96
4790637	97	88	96
4790638	91	80	65
Blank	98	89	102
LCS	100	92	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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 PM

Surrogate Quality Control

LCSD	100	91	111	
Limits:	51-123	64-112	52-151	

Analysis Name: UST-Waters by 8260B
Batch number: N061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790619	96	98	97	96
4790620	97	97	97	98
4790621	96	97	96	97
4790622	96	98	97	96
4790623	96	98	96	96
4790624	95	97	97	99
4790625	96	97	98	99
4790626	93	94	97	96
Blank	96	98	96	95
LCS	96	99	98	99
MS	97	98	98	100
MSD	97	98	97	99
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: N061671AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790627	101	96	100	106
4790628	99	96	99	100
4790629	99	96	98	104
4790630	101	97	101	106
Blank	103	100	99	101
LCS	103	99	99	108
LCSD	102	95	101	109
MS	101	96	99	108
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: T061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4790631	88	80	91	92
4790632	88	82	85	88
4790633	88	81	86	91
4790634	88	81	85	87
4790635	87	84	85	88
Blank	90	81	86	88
LCS	88	84	87	88
LCSD	87	83	86	88
MS	87	85	87	92
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: T061652AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992976
Reported: 06/29/06 at 02:22 PM

Surrogate Quality Control

4790636	87	84	87	90
4790637	87	82	87	89
4790638	87	81	86	90
Blank	89	83	85	88
LCS	89	83	86	90
LCSD	87	84	86	88
MS	88	85	89	92
Limits:	80-116	77-113	80-113	78-113

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10182 Group# 992976 Sample # 4790619-39

COC # 0124056

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun- Aquaterra / Langan — Acct. #:
Project Name/#: Sun- Philadelphia Refinery AOI-6 — PWSID #:
Project Manager: B. Spancake / J. Hanna — P.O.#:
Sampler: M. Brad Spancake — Quote #:
Name of state where samples were collected: PA

(3) Matrix

(4) Preservation

(5) Analyses Requested

(2)								8260 PAHs, BTEX, MTBE, Cumene, 1,2-dichloroethane	8011 EDB	6020 Dissolved Pb	8270 Fluorene, Phenanthrene, Naphthalene, Pyrene, Chrysene					
BA5-060806	6/8/06	1150	X			X	8									
B158-060806	6/8/06	1205	X			X	8									
B48-060806	6/8/06	1235	X			X	8									
B48D-060806	6/8/06	1220	X			X	8									
B160-060806	6/8/06	1250	X			X	8									
B159-060806	6/8/06	1300	X			X	8									
B151-060806	6/8/06	1320	X			X	8									
B154-060806	6/8/06	1335	X			X	8									
B156-060806	6/8/06	1345	X			X	8									
B155-060806	6/8/06	1400	X			X	8									

For Lab Use Only
FSC:
SCR #: 29152

(6) Remarks

Please Provide EQuis EDD

Dissolved Pb samples are unfiltered/unpreserved

temp 1.6-4.6°C

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary — Type VI (Raw Data)
Type I (Tier I) — GLP
Type II (Tier II) — Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes (No)
Site-specific QC required? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
Bottle Storage			Aquaterra		
M. Brad Spancake	6/8/06	1530	Aquaterra Friday	6/8/06	1530
M. Brad Spancake	6/9/06	1515		6-9-06	1515
	6/9/06	1810			
			Tammy Delsol	6/9/06	1820

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

TJB (2)
2102.02
6/9/06

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10132 Group# 992976 Sample # 4790619-39

COC # 0124052

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun-Aquaterra / Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOI-C PWSID #:
Project Manager: B. Spancake / J. Hanna P.O.#:
Sampler: M. B. Spancake Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) Analyses Requested

Sample Identification	Date Collected	Time Collected	Matrix				# of containers	8260 PAHs, 1,2-dichloroethane	8011 EDB	6020 Dissolved Pb	8270 Fluorene, Phenanthrene, Pyrene, Chrysene, Naphthalene										Remarks
B149-060806 Trip Blank	6/8/06	1410	X			X	2	X													Please Provide EQUIS EDD Dissolved Pb samples are unfiltered / unpreserved temp 1.6-4.6°C

For Lab Use Only
FSC:
SCR #:

(6)

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary, Type I (Tier I), Type II (Tier II), Type III (NJ Red. Del.), Type IV (CLP), Type VI (Raw Data), GLP, Other
SDG Complete? Yes (No)
Site-specific QC required? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad	6/8/06	1530	Aquaterra Fridge	6/8/06	1530
M. Brad	6/9/06	1515	[signature]	6-9-06	1515
[signature]	6/9/06	1800			
			Tammy Helsel	6/9/06	1820

TIB (3)

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10132 Group# 992976 Sample # 4790619-39

COC # 0124047

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun-Aquaterra/Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:
Project Manager: B. Spancake/J. Hanna P.O.#:
Sampler: M. B. Spancake Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) Analyses Requested

	Date	Time					8260 PAHs 1,2-dichloroethane	8011 EDB	6020 Dissolved Pb	8270 Fluorene Phenanthrene Pyrene Chrysen Naphthalene
B153-060906	6/9/06	1040	X			X	X	X	X	X
B152-060906	6/9/06	1055	X			X	X	X	X	X
B94-060906	6/9/06	1110	X			X	X	X	X	X
WPM8-060906	6/9/06	0835	X			X	X	X	X	X
WPM11-060906	6/9/06	0910	X			X	X	X	X	X
B163-060906	6/9/06	1020	X			X	X	X	X	X
B145-060906	6/9/06	1125	X			X	X	X	X	X
WP16-5-060906	6/9/06	0920	X			X	X	X	X	X
B157-060906	6/9/06	1305	X			X	X	X	X	X
TRIP BLANK										

(6) **Remarks**
Please provide EQuIS EDD
Dissolved Pb samples are unfiltered/unpreserved
temp 1.6-4.6°C

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad Spancake	6/9/06	1515		6-9-06	1515
	6/9/06	1820			
			Tammy Kelsol	6/9/06	1820

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Lancaster Laboratories

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

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

610-431-5733

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 992792. Samples arrived at the laboratory on Thursday, June 08, 2006. The PO# for this group is SUNOCO PHILLY REFINER.

Client Description	Lancaster Labs Number
B117-060706 Grab Water Sample	4789401
B46-060706 Grab Water Sample	4789402
B115-060706 Grab Water Sample	4789403
B123-060706 Grab Water Sample	4789404
B92-060706 Grab Water Sample	4789405

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Robin C. Runkle
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789401

B117-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:00 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

11706

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	16.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 15:55	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 10:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 03:08	William T Parker	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789401

B117-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:00 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

11706

02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 09:12	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 09:12	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	06/22/2006 19:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/12/2006 15:40	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/10/2006 11:45	Mark P Mastropietro	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789402

B46-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:40 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B4606

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 15:57	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 11:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 04:01	William T Parker	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789402

B46-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:40 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B4606

02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 09:59	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 09:59	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	06/22/2006 19:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/12/2006 15:40	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/10/2006 11:45	Mark P Mastropietro	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789403

B115-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:55 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B1156

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:00	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 12:01	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/16/2006 21:00	William T Parker	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789403

B115-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 12:55 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B1156

02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 10:23	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 10:23	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	06/22/2006 19:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/12/2006 15:40	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/13/2006 07:30	Danette S Cavalier	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4789404

B123-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 13:15 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B1236

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	45.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	17.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	7.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	38.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:02	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 12:31	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 04:53	William T Parker	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4789404

B123-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 13:15 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B1236

02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 10:46	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 10:46	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	06/22/2006 19:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/12/2006 15:40	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/10/2006 11:45	Mark P Mastropietro	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4789405

B92-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 13:30 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B9206

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	24.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	15.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	7.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4789405

B92-060706 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/07/2006 13:30 by MBS

Account Number: 10132

Submitted: 06/08/2006 17:08
Reported: 06/27/2006 at 10:06
Discard: 07/28/2006

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

B9206

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/23/2006 16:04	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/13/2006 13:02	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 05:46	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/14/2006 11:10	Seth J Good	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/14/2006 11:10	Seth J Good	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	2	06/22/2006 19:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/12/2006 15:40	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/10/2006 11:45	Mark P Mastropietro	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992792
Reported: 06/27/06 at 10:06 AM

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: 06160WAI026	Sample number(s): 4789401-4789402,4789404-4789405								
Naphthalene	< 5.	5.	1.	ug/l	90	91	70-104	1	30
Fluorene	< 5.	5.	1.	ug/l	98	98	61-116	0	30
Phenanthrene	< 5.	5.	1.	ug/l	90	90	68-111	0	30
Pyrene	< 5.	5.	1.	ug/l	100	96	68-114	4	30
Chrysene	< 5.	5.	1.	ug/l	93	90	70-111	3	30
Batch number: 061630013A	Sample number(s): 4789401-4789405								
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	96	60-140	4	20
Batch number: 06163WAG026	Sample number(s): 4789403								
Naphthalene	< 5.	5.	1.	ug/l	85	90	70-104	5	30
Fluorene	< 5.	5.	1.	ug/l	98	97	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	92	91	68-111	1	30
Pyrene	< 5.	5.	1.	ug/l	90	95	68-114	5	30
Chrysene	< 5.	5.	1.	ug/l	88	92	70-111	5	30
Batch number: 061736050001A	Sample number(s): 4789401-4789405								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	101		86-115		
Batch number: T061651AA	Sample number(s): 4789401-4789405								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	97	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	108	104	85-117	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	107	107	77-132	0	30
Toluene	< 5.	5.	0.7	ug/l	97	96	85-115	0	30
Ethylbenzene	< 5.	5.	0.8	ug/l	91	90	82-119	1	30
Isopropylbenzene	< 5.	5.	1.	ug/l	93	94	80-120	1	30
Xylene (Total)	< 5.	5.	0.8	ug/l	95	94	83-113	1	30

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: 061630013A	Sample number(s): 4789401-4789405 UNSPK: 4789401 BKG: 4789402								
Ethylene dibromide	48*		65-135			< 0.029	< 0.028	0 (1)	30
Batch number: 061736050001A	Sample number(s): 4789401-4789405 UNSPK: P790724 BKG: P790724								
Lead	94	91	78-120	2	20	0.0171	0.0168	2	20
Batch number: T061651AA	Sample number(s): 4789401-4789405 UNSPK: 4789401								

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992792
Reported: 06/27/06 at 10:06 AM

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
Methyl Tertiary Butyl Ether	99		69-127						
Benzene	112		83-128						
1,2-Dichloroethane	113		70-143						
Toluene	105		83-127						
Ethylbenzene	100		82-129						
Isopropylbenzene	106		81-130						
Xylene (Total)	103		82-130						

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: PAHs in Water by GC/MS
Batch number: 06160WAI026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4789401	90	87	94
4789402	88	91	96
4789404	88	89	93
4789405	88	86	94
Blank	94	91	98
LCS	95	89	104
LCSD	92	90	101
Limits:	51-123	64-112	52-151

Analysis Name: EDB in Wastewater
Batch number: 061630013A

	1,1,2,2-Tetrachloroethane
4789401	55
4789402	79
4789403	65
4789404	42*
4789405	33*
Blank	109
DUP	48*
LCS	116
LCSD	107
MS	49*
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06163WAG026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992792
Reported: 06/27/06 at 10:06 AM

Surrogate Quality Control

4789403	82	87	94
Blank	84	88	95
LCS	83	92	94
LCSD	86	92	101
Limits:	51-123	64-112	52-151

Analysis Name: UST-Waters by 8260B
Batch number: T061651AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4789401	90	82	86	88
4789402	87	80	86	88
4789403	88	81	85	86
4789404	89	81	84	90
4789405	88	80	87	91
Blank	90	81	86	88
LCS	88	84	87	88
LCSD	87	83	86	88
MS	87	85	87	92
Limits:	80-116	77-113	80-113	78-113

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10132 Group# 99292 Sample # 478940105

COC # 0124055

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun-Aquaterra | Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:
Project Manager: B. Spancake | J. Hanna P.O.#:
Sampler: M.B Spancake Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) Analyses Requested

Sample Identification	Date Collected	Time Collected	Matrix		Preservation	# of containers	8260 PAUG, BTEX, MTBE, 1,2-dichloroethane	8011 EDB	6020 Dissolved Pb	8270 Chrysene, Fluorene, Phenanthrene, Naphthalene, Pyrene					Remarks
B117-060706	6/7/06	1200	X		X	8									Please provide Equis EDD
B46-060706	6/7/06	1240	X		X	8									
B115-060706	6/7/06	1255	X		X	8									
B123-060706	6/7/06	1315	X		X	8									Dissolved Pb samples are unfiltered / unpreserved
B92-060706	6/7/06	1330	X		X	8									

For Lab Use Only
FSC:
SCR #:

(6) Remarks

(7) **Turnaround Time Requested** (TAT) (please circle): Normal / Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes (No)
Site-specific QC required? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Bacot	6/7/06	1500	Aquaterra Fridge	6/7/06	1520
	6/8	1000	Maureen McFallside	6/8/06	10:10
Maureen McFallside	6/8/06	17:05			

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

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

610-431-5733

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 992559. Samples arrived at the laboratory on Wednesday, June 07, 2006. The PO# for this group is SUNOCO PHILLY REFINER.

Client Description	Lancaster Labs Number
B134D-060606 Grab Water Sample	4788099
URS3-060606 Grab Water Sample	4788100
B133D-060606 Grab Water Sample	4788101
URS2-060606 Grab Water Sample	4788102
U1-060606 Grab Water Sample	4788103
U2-060606 Grab Water Sample	4788104
U4-060606 Grab Water Sample	4788105
U5-060606 Grab Water Sample	4788106
B132D-060606 Grab Water Sample	4788107
URS1-060606 Grab Water Sample	4788108
URS4-060606 Grab Water Sample	4788109
B131-060606 Grab Water Sample	4788110
B164-060606 Grab Water Sample	4788111
URS5-060606 Grab Water Sample	4788112
B125-060606 Grab Water Sample	4788113
B126-060606 Grab Water Sample	4788114

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC	Langan	Attn: Joseph Catricks

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Analysis Report

COPY TO

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788099

B134D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 11:55 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

B134D

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/20/2006 19:36	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 08:06	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 13:48	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 18:24	Angela D Sneeringer	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788099

B134D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 11:55 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

B134D

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 18:24	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:34	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788100

URS3-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 11:40 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

URS3-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	98.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	260.	25.	5.	ug/l	5
03967	Pyrene	129-00-0	160.	25.	5.	ug/l	5
03971	Chrysene	218-01-9	45.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	18.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	18.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	9.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 01:40	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 09:07	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 14:40	Joseph M Gambler	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 21:49	William T Parker	5

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Analysis Report

Lancaster Laboratories Sample No. WW 4788100

URS3-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 11:40 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

URS3-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 18:47	Angela D Sneeringer	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 18:47	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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Analysis Report

Lancaster Laboratories Sample No. WW 4788101

B133D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:10 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

B133D

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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Analysis Report

Lancaster Laboratories Sample No. WW 4788101

B133D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:10 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

B133D

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 01:44	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 10:07	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 15:33	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 19:09	Angela D Sneeringer	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 19:09	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788102

URS2-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:25 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

URS2-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	6.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	8.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	11.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	7.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788102

URS2-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:25 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

URS2-

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 01:49	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 10:37	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 16:26	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 22:26	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 22:26	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788103

U1-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:00 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---1

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	60.	50.	10.	ug/l	1
03956	Fluorene	86-73-7	550.	50.	10.	ug/l	1
03963	Phenanthrene	85-01-8	1,100.	50.	10.	ug/l	1
03967	Pyrene	129-00-0	2,600.	250.	50.	ug/l	5
03971	Chrysene	218-01-9	810.	50.	10.	ug/l	1
	Due to insufficient sample, the reporting limits for the GC/MS semivolatile compounds were raised.						
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 01:54	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 11:37	James H Place	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788103

U1-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:00 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---1

07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 17:18	Joseph M Gambler	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 22:41	William T Parker	5
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 22:49	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 22:49	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788104

U2-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:45 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788104

U2-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 12:45 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---2

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 01:58	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 12:07	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 18:11	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 23:11	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 23:11	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788105

U4-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---4

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/15/2006 02:03	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 01:54	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 19:03	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 23:34	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788105

U4-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---4

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 23:34	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/13/2006 19:43	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788106

U5-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:30 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

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

U---5

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	0.0036	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788106

U5-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:30 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:51
Discard: 07/24/2006

SUN: Aquaterra Tech.
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West Chester PA 19381

U---5

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 14:44	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 13:08	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/14/2006 23:34	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/08/2006 23:57	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/08/2006 23:57	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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Analysis Report

Lancaster Laboratories Sample No. WW 4788107

B132D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:15 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B132D

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0095	ug/l	1
	The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.						
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

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Analysis Report

Lancaster Laboratories Sample No. WW 4788107

B132D-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:15 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B132D

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 14:51	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/11/2006 13:38	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 00:26	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 00:20	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 00:20	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788108

URS1-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:30 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

URS-1

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	8.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 14:54	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 02:25	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 01:19	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 00:42	Kelly E Brickley	1

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Analysis Report

Lancaster Laboratories Sample No. WW 4788108

URS1-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:30 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

URS-1

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 00:42	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788109

URS4-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:55 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

URS-4

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 14:56	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 02:55	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 02:12	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 01:05	Kelly E Brickley	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788109

URS4-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 13:55 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

URS-4

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 01:05	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4788110

B131-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:10 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B131-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	6.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	17.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 14:58	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 03:25	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 03:04	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 01:28	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788110

B131-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:10 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B131-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 01:28	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788111

B164-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:25 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B164-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	0.0050	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	< 5.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	< 5.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	< 5.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	7.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 20:54	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 03:55	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 03:57	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 01:50	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788111

B164-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:25 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B164-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 01:50	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/18/2006 18:33	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788112

URS5-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:35 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

URS5-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.029	0.029	0.0096	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	270.	24.	5.	ug/l	5
03956	Fluorene	86-73-7	17.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	25.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	< 5.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 25.	25.	3.	ug/l	5
05401	Benzene	71-43-2	5,900.	250.	25.	ug/l	50
05402	1,2-Dichloroethane	107-06-2	140.	25.	5.	ug/l	5
05407	Toluene	108-88-3	4,900.	250.	35.	ug/l	50
05415	Ethylbenzene	100-41-4	600.	25.	4.	ug/l	5
05420	Isopropylbenzene	98-82-8	37.	25.	5.	ug/l	5
06310	Xylene (Total)	1330-20-7	2,900.	250.	40.	ug/l	50

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 15:01	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 04:25	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 04:49	William T Parker	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 11:28	Joseph M Gambler	5

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788112

URS5-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:35 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

SUN: Aquaterra Tech.
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West Chester PA 19381

URS5-

02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 02:13	Kelly E Brickley	5
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 02:35	Kelly E Brickley	50
01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 02:13	Kelly E Brickley	5
01163	GC/MS VOA Water Prep	SW-846 5030B	2	06/09/2006 02:35	Kelly E Brickley	50
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788113

B125-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B125-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0094	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	7.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	17.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	7.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	7.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	73.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	79.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	12.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	10.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	110.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 15:03	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 04:56	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 05:41	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 02:58	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788113

B125-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B125-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 02:58	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788114

B126-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B126-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
06035	Lead	7439-92-1	< 0.0010	0.0010	0.000047	mg/l	1
07879	EDB in Wastewater						
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	0.0095	ug/l	1
07805	PAHs in Water by GC/MS						
03947	Naphthalene	91-20-3	23.	5.	1.	ug/l	1
03956	Fluorene	86-73-7	36.	5.	1.	ug/l	1
03963	Phenanthrene	85-01-8	16.	5.	1.	ug/l	1
03967	Pyrene	129-00-0	6.	5.	1.	ug/l	1
03971	Chrysene	218-01-9	< 5.	5.	1.	ug/l	1
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	220.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	61.	5.	0.7	ug/l	1
05415	Ethylbenzene	100-41-4	24.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	42.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	110.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
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 Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06035	Lead	SW-846 6020	1	06/19/2006 15:05	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	06/21/2006 05:26	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	06/15/2006 06:34	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	06/09/2006 03:21	Kelly E Brickley	1

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

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Analysis Report

Lancaster Laboratories Sample No. WW 4788114

B126-060606 Grab Water Sample
SUN: Philadelphia Refinery AOI-6

Collected:06/06/2006 14:50 by MBS

Account Number: 10132

Submitted: 06/07/2006 17:40
Reported: 06/23/2006 at 14:52
Discard: 07/24/2006

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

B126-

01163	GC/MS VOA Water Prep	SW-846 5030B	1	06/09/2006 03:21	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	06/16/2006 01:45	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	06/08/2006 20:30	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	06/08/2006 19:20	Jessica Agosto	1

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

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Analysis Report

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992559
Reported: 06/23/06 at 02:52 PM

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: 061590007A	Sample number(s): 4788099-4788114								
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	108	60-140	8	20
Batch number: 06159WAB026	Sample number(s): 4788099-4788114								
Naphthalene	< 5.	5.	1.	ug/l	85	83	70-104	2	30
Fluorene	< 5.	5.	1.	ug/l	92	92	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	87	92	68-111	5	30
Pyrene	< 5.	5.	1.	ug/l	96	99	68-114	4	30
Chrysene	< 5.	5.	1.	ug/l	88	89	70-111	0	30
Batch number: 061646050002A	Sample number(s): 4788099								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	102		86-115		
Batch number: 061646050003A	Sample number(s): 4788100-4788105								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	100		86-115		
Batch number: 061676050001A	Sample number(s): 4788106-4788110,4788112-4788114								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	98		86-115		
Batch number: 061696050001A	Sample number(s): 4788111								
Lead	< 0.0010	0.0010	0.00004 7	mg/l	99		86-115		
Batch number: L061591AA	Sample number(s): 4788099-4788101								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	105	104	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	114	110	85-117	3	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	117	115	77-132	2	30
Toluene	< 5.	5.	0.7	ug/l	109	107	85-115	2	30
Ethylbenzene	< 5.	5.	0.8	ug/l	112	109	82-119	3	30
Isopropylbenzene	< 5.	5.	1.	ug/l	110	107	80-120	2	30
Xylene (Total)	< 5.	5.	0.8	ug/l	109	106	83-113	3	30
Batch number: L061592AA	Sample number(s): 4788102-4788114								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	100		73-119		
Benzene	< 5.	5.	0.5	ug/l	111		85-117		
1,2-Dichloroethane	< 5.	5.	1.	ug/l	113		77-132		
Toluene	< 5.	5.	0.7	ug/l	104		85-115		
Ethylbenzene	< 5.	5.	0.8	ug/l	107		82-119		
Isopropylbenzene	< 5.	5.	1.	ug/l	105		80-120		
Xylene (Total)	< 5.	5.	0.8	ug/l	104		83-113		

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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992559
Reported: 06/23/06 at 02:52 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 %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 061590007A	Sample number(s): 4788099-4788114 UNSPK: 4788099 BKG: 4788100								
Ethylene dibromide	48*		65-135			< 0.028	< 0.028	0 (1)	30
Batch number: 061646050002A	Sample number(s): 4788099 UNSPK: P787760 BKG: P787760								
Lead	114	98	78-120	15	20	< 0.0010	< 0.0010	7 (1)	20
Batch number: 061646050003A	Sample number(s): 4788100-4788105 UNSPK: P787743 BKG: P787743								
Lead	95	95	78-120	0	20	< 0.0010	< 0.0010	3 (1)	20
Batch number: 061676050001A	Sample number(s): 4788106-4788110,4788112-4788114 UNSPK: P791619 BKG: P791619								
Lead	99	101	78-120	2	20	< 0.0010	< 0.0010	1 (1)	20
Batch number: 061696050001A	Sample number(s): 4788111 UNSPK: P790619 BKG: P790619								
Lead	97	99	78-120	2	20	< 0.0010	< 0.0010	200* (1)	20
Batch number: L061591AA	Sample number(s): 4788099-4788101 UNSPK: P787062								
Methyl Tertiary Butyl Ether	106		69-127						
Benzene	118		83-128						
1,2-Dichloroethane	116		70-143						
Toluene	113		83-127						
Ethylbenzene	114		82-129						
Isopropylbenzene	113		81-130						
Xylene (Total)	112		82-130						
Batch number: L061592AA	Sample number(s): 4788102-4788114 UNSPK: P788470								
Methyl Tertiary Butyl Ether	(2)	(2)	69-127	1	30				
Benzene	122	125	83-128	3	30				
1,2-Dichloroethane	119	121	70-143	2	30				
Toluene	113	116	83-127	3	30				
Ethylbenzene	114	117	82-129	3	30				
Isopropylbenzene	115	119	81-130	4	30				
Xylene (Total)	113	117	82-130	3	30				

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: EDB in Wastewater
Batch number: 061590007A

	1,1,2,2-Tetrachloroethane
4788099	55
4788100	60
4788101	51*
4788102	11*
4788103	16*
4788104	47*
4788105	87

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992559
Reported: 06/23/06 at 02:52 PM

Surrogate Quality Control

4788106	41*
4788107	49*
4788108	99
4788109	82
4788110	68
4788111	72
4788112	89
4788113	125*
4788114	114
Blank	116
DUP	32*
LCS	117
LCSD	129*
MS	42*
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06159WAB026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4788099	81	84	99
4788100	80	92	89
4788101	89	90	100
4788102	90	91	100
4788103	106	88	101
4788104	96	90	100
4788105	89	90	101
4788106	92	89	96
4788107	92	85	101
4788108	92	90	99
4788109	86	84	90
4788110	88	91	102
4788111	91	87	100
4788112	89	76	98
4788113	93	87	97
4788114	92	86	97
Blank	85	84	96
LCS	93	92	105
LCSD	89	93	106
Limits:	51-123	64-112	52-151

Analysis Name: UST-Waters by 8260B
Batch number: L061591AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4788099	93	90	90	82
4788100	91	89	89	84
4788101	93	90	89	81
Blank	93	89	91	81
LCS	92	92	93	85
LCSD	91	90	92	85
MS	93	89	91	83
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B

*- 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 background result was more than four times the spike added.

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Quality Control Summary

Client Name: SUN: Aquaterra Tech. Group Number: 992559
Reported: 06/23/06 at 02:52 PM

Surrogate Quality Control

Batch number: L061592AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4788102	92	88	90	84
4788103	92	89	91	88
4788104	94	90	88	82
4788105	93	89	88	82
4788106	92	89	89	83
4788107	93	91	88	82
4788108	95	90	88	81
4788109	94	90	89	82
4788110	92	90	89	86
4788111	92	89	92	83
4788112	92	88	88	86
4788113	93	89	87	83
4788114	93	89	89	84
Blank	93	91	89	82
LCS	92	90	91	86
MS	94	93	89	84
MSD	94	91	89	84
Limits:	80-116	77-113	80-113	78-113

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 10132 Group# 992559 Sample # 4288099-115

COC # 0124053

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun-Aquaterra/Langan Acct. #:

Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:

Project Manager: B. Spancake / J. Hanna P.O.#:

Sampler: M. B. Spancake & M. Hinderling Quote #:

Name of state where samples were collected: PA

(4) Matrix

(5) Analyses Requested

For Lab Use Only
FSC:
SCR #:

(6) p. 1 of 2

(2) Sample Identification	Date Collected	Time Collected	(3) # of containers	Matrix	8260B PAHs BTEX, MTBE, Chlorinated Ethenes, 1,2-dichloroethane	8011 EDB	6020 Dissolved Pb	8270 Naphthalene, Fluorene, Chrysene, Phenanthrene, Pyrene	Remarks
B134D-060606	6/6/06	1155	X	X	8				Please provide EQuis EDD
URS3-060606	6/6/06	1140	X	X	8				
B133D-060606	6/6/06	1210	X	X	8				
URS2-060606	6/6/06	1225	X	X	8				Dissolved Pb are unfiltered/unpreserved
U1-060606	6/6/06	1300	X	X	7				
U2-060606	6/6/06	1245	X	X	8				
U4-060606	6/6/06	1350	X	X	8				L4-4 gal
U5-060606	6/6/06	1330	X	X	8				
B132D-060606	6/6/06	1415	X	X	8				
URS1-060606	6/6/06	1430	X	X	8				

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Date results are needed:

Rush results requested by (please circle): Phone Fax E-mail

Phone #: Fax #:

E-mail address:

(8) **Data Package Options** (please circle if required)

QC Summary Type VI (Raw Data)

Type I (Tier I) GLP

Type II (Tier II) Other

Type III (NJ Red. Del.)

Type IV (CLP)

SDG Complete? Yes No

Site-specific QC required? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad Spancake	6/6/06	1600	Aquaterra Fedex	6/6/06	1600
AJ Pudge	6/7/06	930	Rick Hulbert	6/7/06	930
Rick Hulbert	6/7/06	930	Marvin McAllister	6/7/06	9:30
Marvin McAllister	6/7/06	17:40			
			Tammy Leland	6/7/06	1740

(9)

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 10132 Group# 992559 Sample # 428099-115

COC # 0124054

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun Aquaterra / Langan Acct. #:

Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:

Project Manager: B. Spancake / J. Hanna P.O.#:

Sampler: M.B. Spancake / M. Hinderling Quote #:

Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

(6) p. 2 of 2

(2) Sample Identification	Date Collected	Time Collected	(3) Matrix			(4) # of Containers	(5) Analyses Requested: 8260 PAUG, 1,2-dichloroethane; 8011 EDB; Lab Dissolved Pb; 8270 Chrysene; Fluorene; Naphthalene; Phenanthrene; Pyrene	Remarks
URS4-060606	6/6/06	1355	X		X	8		Please provide EQuIS EDD
B131-060606	6/6/06	1410	X		X	8		
B164-060606	6/6/06	1425	X		X	8		
URS5-060606	6/6/06	1435	X		X	8		Dissolved Pb are unfiltered/unpreserved
B125-060606	6/6/06	1450	X		X	8		
B126-060606	6/6/06	1450	X		X	8		
TRIP BLANK						2		1.4-4.4°C

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes (No)
Site-specific QC required? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Bard	6/6/06	1600	Aquaterra Fridge	6/6/06	1600
AT PUDGE	6/7/06	0830	Lisa Holden	6/7/06	9:30
Lisa Holden	6/7/06	0833	Marvin McCallister	6/7/06	9:30
Marvin McCallister	6/7/06	17:40			
			Tammy Leland	6/7/06	1740

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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ANALYTICAL RESULTS

Prepared for:

SUN: Aquaterra Tech.
PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 992559. Samples arrived at the laboratory on Wednesday, Jun 7 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is SUNOCO PHILLY REFINER.

Sample No.	Collected	Client Description
4788099	6/6/2006 11:55	B134D-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788100	6/6/2006 11:40	URS3-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788101	6/6/2006 12:10	B133D-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788102	6/6/2006 12:25	URS2-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788103	6/6/2006 13:00	U1-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788104	6/6/2006 12:45	U2-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788105	6/6/2006 13:50	U4-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788106	6/6/2006 13:30	U5-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788107	6/6/2006 14:15	B132D-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788108	6/6/2006 14:30	URS1-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788109	6/6/2006 13:55	URS4-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788110	6/6/2006 14:10	B131-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788111	6/6/2006 14:25	B164-060606 Grab Water Sample SUN: Philadelphia Refinery AOI-6
4788112	6/6/2006 14:35	URS5-060606 Grab Water Sample

ANALYTICAL RESULTS

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PO Box 744
West Chester PA 19381
610-431-5733

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

		SUN: Philadelphia Refinery AOI-6
4788113	6/6/2006 14:50	B125-060606 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6
4788114	6/6/2006 14:50	B126-060606 Grab Water Sample
		SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

SUN: Aquaterra Tech. Report Date: 6/23/2006 14:52
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/7/2006 17:40
SDG:

Analysis Name	Units	4788099 B134D-06			4788100 URS3-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0094	< 0.028	0.028	0.0094
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	98.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	260.	25.	5.
Pyrene	ug/l	< 5.	5.	1.	160.	25.	5.
Chrysene	ug/l	< 5.	5.	1.	45.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	18.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	18.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	9.	5.	0.8

Analysis Name	Units	4788101 B133D-06			4788102 URS2-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	6.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	8.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	11.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	7.	5.	0.8

Analysis Name	Units	4788103 U1-06060			4788104 U2-06060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0096
Naphthalene	ug/l	60.	50.	10.	< 5.	5.	1.
Fluorene	ug/l	550.	50.	10.	< 5.	5.	1.
Phenanthrene	ug/l	1,100.	50.	10.	< 5.	5.	1.
Pyrene	ug/l	2,600.	250.	50.	< 5.	5.	1.

** = This limit was used in the evalution of the final result

SUN: Aquaterra Tech. Report Date: 6/23/2006 14:52
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/7/2006 17:40
SDG:

Chrysene	ug/l	810.	50.	10.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4788105 U4-06060			4788106 U5-06060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	0.0036	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0096	< 0.028	0.028	0.0095
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4788107 B132D-06			4788108 URS1-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.029	0.029	0.0095	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	8.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

		4788109			4788110		

** = This limit was used in the evalution of the final result

SUN: Aquaterra Tech. Report Date: 6/23/2006 14:52
Project: SUN: Philadelphia Refinery AOI-6 Submit Date: 6/7/2006 17:40
SDG:

Analysis Name	Units	URS4-060			B131-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Fluorene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	6.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7	< 5.	5.	0.7
Ethylbenzene	ug/l	< 5.	5.	0.8	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.	17.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8	< 5.	5.	0.8

Analysis Name	Units	4788111 B164-060			4788112 URS5-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	0.0050	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0095	< 0.029	0.029	0.0096
Naphthalene	ug/l	< 5.	5.	1.	270.	24.	5.
Fluorene	ug/l	< 5.	5.	1.	17.	5.	1.
Phenanthrene	ug/l	< 5.	5.	1.	25.	5.	1.
Pyrene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 25.	25.	3.
Benzene	ug/l	< 5.	5.	0.5	5,900.	250.	25.
1,2-Dichloroethane	ug/l	< 5.	5.	1.	140.	25.	5.
Toluene	ug/l	< 5.	5.	0.7	4,900.	250.	35.
Ethylbenzene	ug/l	< 5.	5.	0.8	600.	25.	4.
Isopropylbenzene	ug/l	7.	5.	1.	37.	25.	5.
Xylene (Total)	ug/l	< 5.	5.	0.8	2,900.	250.	40.

Analysis Name	Units	4788113 B125-060			4788114 B126-060		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	< 0.0010	0.0010	0.000047	< 0.0010	0.0010	0.000047
Ethylene dibromide	ug/l	< 0.028	0.028	0.0094	< 0.028	0.028	0.0095
Naphthalene	ug/l	7.	5.	1.	23.	5.	1.
Fluorene	ug/l	17.	5.	1.	36.	5.	1.
Phenanthrene	ug/l	7.	5.	1.	16.	5.	1.
Pyrene	ug/l	7.	5.	1.	6.	5.	1.
Chrysene	ug/l	< 5.	5.	1.	< 5.	5.	1.
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5	< 5.	5.	0.5

** = This limit was used in the evalution of the final result

SUN: Aquaterra Tech.
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 6/23/2006 14:52
Submit Date: 6/7/2006 17:40

Benzene	ug/l	73.	5.	0.5	220.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.	< 5.	5.	1.
Toluene	ug/l	79.	5.	0.7	61.	5.	0.7
Ethylbenzene	ug/l	12.	5.	0.8	24.	5.	0.8
Isopropylbenzene	ug/l	10.	5.	1.	42.	5.	1.
Xylene (Total)	ug/l	110.	5.	0.8	110.	5.	0.8

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4788099	**B134D-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/20/06 1936	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 0806	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1348	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 1824	Angela D Sneeringer	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 1824	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1934	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788100	**URS3-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0140	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 0907	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1440	Joseph M Gambler	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 2149	William T Parker	5
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 1847	Angela D Sneeringer	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 1847	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788101	**B133D-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0144	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1007	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1533	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 1909	Angela D Sneeringer	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 1909	Angela D Sneeringer	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788102	**URS2-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0149	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1037	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1626	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 2226	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 2226	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788103	**U1-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0154	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1137	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1718	Joseph M Gambler	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 2241	William T Parker	5
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 2249	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 2249	Kelly E Brickley	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788104	**U2-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0158	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1207	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1811	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 2311	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 2311	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788105	**U4-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/15/06 0203	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0154	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 1903	Joseph M Gambler	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 2334	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 2334	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/13/06 1943	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788106	**U5-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1444	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1308	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/14/06 2334	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/8/06 2357	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/8/06 2357	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788107	**B132D-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1451	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/11/06 1338	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0026	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0020	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0020	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788108	**URS1-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1454	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0225	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0119	William T Parker	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0042	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0042	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788109	**URS4-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1456	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0255	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0212	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0105	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0105	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788110	**B131-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1458	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0325	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0304	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0128	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0128	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788111	**B164-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 2054	David K Beck	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0355	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0357	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0150	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0150	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/18/06 1833	James L Mertz	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788112	**URS5-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1501	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0425	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0449	William T Parker	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 1128	Joseph M Gambler	5
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0213	Kelly E Brickley	5
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0235	Kelly E Brickley	50
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0213	Kelly E Brickley	5
01163	GC/MS VOA Water Prep	SW-846 5030B	2	6/9/06 0235	Kelly E Brickley	50
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4788113	**B125-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1503	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0456	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0541	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0258	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0258	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1
4788114	**B126-060606 Grab Water Sample**					
06035	Lead	SW-846 6020	1	6/19/06 1505	Jayme E Curet	1
07879	EDB in Wastewater	SW-846 8011	1	6/21/06 0526	James H Place	1
07805	PAHs in Water by GC/MS	SW-846 8270C	1	6/15/06 0634	William T Parker	1
02302	UST-Waters by 8260B	SW-846 8260B	1	6/9/06 0321	Kelly E Brickley	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	6/9/06 0321	Kelly E Brickley	1
06050	ICP/MS SW-846 Water	SW-846 3010A modified	1	6/16/06 0145	Helen L Schaeffer	1
07786	EDB Extraction	SW-846 8011	1	6/8/06 2030	Kerrie A Greenfield	1
07807	BNA Water Extraction	SW-846 3510C	1	6/8/06 1920	Jessica Agosto	1

Client Name: SUN: Aquaterra Tech. Group Number: 992559

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 061590007A		Sample number(s): 4788099-4788114							
Ethylene dibromide	< 0.030	0.030	0.010	ug/l	100	108	60-140	8	20
Batch number: 06159WAB026		Sample number(s): 4788099-4788114							
Naphthalene	< 5.	5.	1.	ug/l	85	83	70-104	2	30
Fluorene	< 5.	5.	1.	ug/l	92	92	61-116	1	30
Phenanthrene	< 5.	5.	1.	ug/l	87	92	68-111	5	30
Pyrene	< 5.	5.	1.	ug/l	96	99	68-114	4	30
Chrysene	< 5.	5.	1.	ug/l	88	89	70-111	0	30
Batch number: 061646050002A		Sample number(s): 4788099							
Lead	< 0.0010	0.0010	0.000047	mg/l	102		86-115		
Batch number: 061646050003A		Sample number(s): 4788100-4788105							
Lead	< 0.0010	0.0010	0.000047	mg/l	100		86-115		
Batch number: 061676050001A		Sample number(s): 4788106-4788110,4788112-4788114							
Lead	< 0.0010	0.0010	0.000047	mg/l	98		86-115		
Batch number: 061696050001A		Sample number(s): 4788111							
Lead	< 0.0010	0.0010	0.000047	mg/l	99		86-115		
Batch number: L061591AA		Sample number(s): 4788099-4788101							
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	105	104	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	114	110	85-117	3	30

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

1,2-Dichloroethane	< 5.	5.	1.	ug/l	117	115	77-132	2	30
Toluene	< 5.	5.	0.7	ug/l	109	107	85-115	2	30
Ethylbenzene	< 5.	5.	0.8	ug/l	112	109	82-119	3	30
Isopropylbenzene	< 5.	5.	1.	ug/l	110	107	80-120	2	30
Xylene (Total)	< 5.	5.	0.8	ug/l	109	106	83-113	3	30

Batch number: L061592AA Sample number(s): 4788102-4788114

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	100		73-119
Benzene	< 5.	5.	0.5	ug/l	111		85-117
1,2-Dichloroethane	< 5.	5.	1.	ug/l	113		77-132
Toluene	< 5.	5.	0.7	ug/l	104		85-115
Ethylbenzene	< 5.	5.	0.8	ug/l	107		82-119
Isopropylbenzene	< 5.	5.	1.	ug/l	105		80-120
Xylene (Total)	< 5.	5.	0.8	ug/l	104		83-113

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: 061590007A	Sample number(s): 4788099-4788114 UNSPK: 4788099 BKG: 4788100								
Ethylene dibromide	48*		65-135			< 0.028	< 0.028	0 (1)	30
Batch number: 061646050002A	Sample number(s): 4788099 UNSPK: P787760 BKG: P787760								
Lead	114	98	78-120	15	20	< 0.0010	< 0.0010	7 (1)	20
Batch number: 061646050003A	Sample number(s): 4788100-4788105 UNSPK: P787743 BKG: P787743								
Lead	95	95	78-120	0	20	< 0.0010	< 0.0010	3 (1)	20
Batch number: 061676050001A	Sample number(s): 4788106-4788110,4788112-4788114 UNSPK: P791619 BKG: P791619								
Lead	99	101	78-120	2	20	< 0.0010	< 0.0010	1 (1)	20
Batch number: 061696050001A	Sample number(s): 4788111 UNSPK: P790619 BKG: P790619								

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Lead	97	99	78-120	2	20	< 0.0010	< 0.0010	200* (1)	20

Batch number: L061591AA Sample number(s): 4788099-4788101 UNSPK: P787062

Methyl Tertiary Butyl Ether	106		69-127
Benzene	118		83-128
1,2-Dichloroethane	116		70-143
Toluene	113		83-127
Ethylbenzene	114		82-129
Isopropylbenzene	113		81-130
Xylene (Total)	112		82-130

Batch number: L061592AA Sample number(s): 4788102-4788114 UNSPK: P788470

Methyl Tertiary Butyl Ether	(2)	(2)	69-127	1	30
Benzene	122	125	83-128	3	30
1,2-Dichloroethane	119	121	70-143	2	30
Toluene	113	116	83-127	3	30
Ethylbenzene	114	117	82-129	3	30
Isopropylbenzene	115	119	81-130	4	30
Xylene (Total)	113	117	82-130	3	30

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: EDB in Wastewater
Batch number: 061590007A

	1,1,2,2-Tetrachloroethane
4788099	55
4788100	60
4788101	51*
4788102	11*
4788103	16*
4788104	47*
4788105	87
4788106	41*
4788107	49*
4788108	99
4788109	82
4788110	68
4788111	72
4788112	89
4788113	125*

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

4788114	114
Blank	116
DUP	32*
LCS	117
LCSD	129*
MS	42*
Limits:	52-120

Analysis Name: PAHs in Water by GC/MS
Batch number: 06159WAB026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4788099	81	84	99
4788100	80	92	89
4788101	89	90	100
4788102	90	91	100
4788103	106	88	101
4788104	96	90	100
4788105	89	90	101
4788106	92	89	96
4788107	92	85	101
4788108	92	90	99
4788109	86	84	90
4788110	88	91	102
4788111	91	87	100
4788112	89	76	98
4788113	93	87	97
4788114	92	86	97
Blank	85	84	96
LCS	93	92	105
LCSD	89	93	106
Limits:	51-123	64-112	52-151

Analysis Name: UST-Waters by 8260B
Batch number: L061591AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4788099	93	90	90	82
4788100	91	89	89	84
4788101	93	90	89	81
Blank	93	89	91	81

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

LCS	92	92	93	85
LCSD	91	90	92	85
MS	93	89	91	83
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Waters by 8260B
Batch number: L061592AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4788102	92	88	90	84
4788103	92	89	91	88
4788104	94	90	88	82
4788105	93	89	88	82
4788106	92	89	89	83
4788107	93	91	88	82
4788108	95	90	88	81
4788109	94	90	89	82
4788110	92	90	89	86
4788111	92	89	92	83
4788112	92	88	88	86
4788113	93	89	87	83
4788114	93	89	89	84
Blank	93	91	89	82
LCS	92	90	91	86
MS	94	93	89	84
MSD	94	91	89	84
Limits:	80-116	77-113	80-113	78-113

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4788099 B134D-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788100 URS3-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788101 B133D-060606 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788102 URS2-060606 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788103 U1-060606 Grab Water Sample

07805 PAHs in Water by GC/MS
Due to insufficient sample, the reporting limits for the GC/MS semivolatile compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788104 U2-060606 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788105 U4-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788106 U5-060606 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788107 B132D-060606 Grab Water Sample

07879 EDB in Wastewater
The surrogate data is outside the QC limits. Results from the reextraction are within the limits. The hold time had expired prior to the reextraction so all results are reported from the original extract. Similar results were obtained in both extracts.

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788108 URS1-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788109 URS4-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788110 B131-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788111 B164-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788112 URS5-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788113 B125-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

4788114 B126-060606 Grab Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 980131. Samples arrived at the laboratory on Thursday, March 02, 2006. The PO# for this group is 2574601.

Client Description	Lancaster Labs Number
BH-B162-030106-1-1.5 Grab Soil Sample	4720657
BH-B160-030106-1-1.5 Grab Soil Sample	4720658
BH-B161-030106-1.5-2 Grab Soil Sample	4720659
BH-B164-030106-1.5-2 Grab Soil Sample	4720660
BH-B157-030106-1-1.5 Grab Soil Sample	4720661
BH-B153-030106-1.5-2 Grab Soil Sample	4720662
BH-B152-030106-1.5-2 Grab Soil Sample	4720663
BH-B151-030106-0.5-1 Grab Soil Sample	4720664
BH-B154-030106-1-1.5 Grab Soil Sample	4720665

ELECTRONIC COPY TO SUN: Aquaterra Tech. Attn: Brad Spancake

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Rachel R. Cochis
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4720657

BH-B162-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 08:45 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B162-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	584.	2.09	0.813	mg/kg	1
00111	Moisture	n.a.	6.9	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	320.	180.	36.	ug/kg	1
03761	Naphthalene	91-20-3	< 180.	180.	36.	ug/kg	1
03768	Fluorene	86-73-7	< 180.	180.	36.	ug/kg	1
03775	Phenanthrene	85-01-8	< 180.	180.	36.	ug/kg	1
03776	Anthracene	120-12-7	< 180.	180.	36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	200.	180.	36.	ug/kg	1
03782	Chrysene	218-01-9	250.	180.	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	290.	180.	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	220.	180.	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 180.	180.	36.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/kg	0.96
05460	Benzene	71-43-2	< 5.	5.	0.5	ug/kg	0.96
05461	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/kg	0.96
05466	Toluene	108-88-3	< 5.	5.	1.	ug/kg	0.96
05471	1,2-Dibromoethane	106-93-4	< 5.	5.	1.	ug/kg	0.96
05474	Ethylbenzene	100-41-4	< 5.	5.	1.	ug/kg	0.96
05479	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/kg	0.96
06301	Xylene (Total)	1330-20-7	< 5.	5.	1.	ug/kg	0.96

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720657

BH-B162-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 08:45 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B162-

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 10:39	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 09:27	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/08/2006 18:36	Kenneth L Boley Jr	0.96
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 14:48	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 14:51	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 14:59	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720658

BH-B160-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 09:40 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B160-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	30.8	2.54	0.992	mg/kg	1
00111	Moisture	n.a.	22.9	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	< 220.	220.	43.	ug/kg	1
03761	Naphthalene	91-20-3	< 220.	220.	43.	ug/kg	1
03768	Fluorene	86-73-7	< 220.	220.	43.	ug/kg	1
03775	Phenanthrene	85-01-8	< 220.	220.	43.	ug/kg	1
03776	Anthracene	120-12-7	< 220.	220.	43.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	< 220.	220.	43.	ug/kg	1
03782	Chrysene	218-01-9	< 220.	220.	43.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	< 220.	220.	43.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	< 220.	220.	43.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 220.	220.	43.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/kg	0.71
05460	Benzene	71-43-2	< 5.	5.	0.5	ug/kg	0.71
05461	1,2-Dichloroethane	107-06-2	< 5.	5.	0.9	ug/kg	0.71
05466	Toluene	108-88-3	< 5.	5.	0.9	ug/kg	0.71
05471	1,2-Dibromoethane	106-93-4	< 5.	5.	0.9	ug/kg	0.71
05474	Ethylbenzene	100-41-4	< 5.	5.	0.9	ug/kg	0.71
05479	Isopropylbenzene	98-82-8	< 5.	5.	0.9	ug/kg	0.71
06301	Xylene (Total)	1330-20-7	< 5.	5.	0.9	ug/kg	0.71

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720658

BH-B160-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 09:40 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B160-

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 10:44	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 10:22	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/08/2006 19:00	Kenneth L Boley Jr	0.71
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 15:04	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 15:09	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 15:12	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720659

BH-B161-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 10:20 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B161-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	70.1	2.48	0.966	mg/kg	1
00111	Moisture	n.a.	21.6	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,100.	210.	43.	ug/kg	1
03761	Naphthalene	91-20-3	340.	210.	43.	ug/kg	1
03768	Fluorene	86-73-7	< 210.	210.	43.	ug/kg	1
03775	Phenanthrene	85-01-8	410.	210.	43.	ug/kg	1
03776	Anthracene	120-12-7	360.	210.	43.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	1,800.	210.	43.	ug/kg	1
03782	Chrysene	218-01-9	2,100.	210.	43.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	2,700.	210.	43.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	2,200.	210.	43.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,300.	210.	43.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 440.	440.	44.	ug/kg	68.87
05460	Benzene	71-43-2	< 440.	440.	44.	ug/kg	68.87
05461	1,2-Dichloroethane	107-06-2	< 440.	440.	88.	ug/kg	68.87
05466	Toluene	108-88-3	< 440.	440.	88.	ug/kg	68.87
05471	1,2-Dibromoethane	106-93-4	< 440.	440.	88.	ug/kg	68.87
05474	Ethylbenzene	100-41-4	< 440.	440.	88.	ug/kg	68.87
05479	Isopropylbenzene	98-82-8	2,200.	440.	88.	ug/kg	68.87
06301	Xylene (Total)	1330-20-7	5,100.	440.	88.	ug/kg	68.87
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories Sample No. SW 4720659

BH-B161-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 10:20 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B161-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 10:49	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 11:17	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 14:00	Susan McMahon-Luu	68.87
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 15:17	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 15:20	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 15:28	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4720660

BH-B164-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 11:00 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B164-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	18.5	2.41	0.941	mg/kg	1
00111	Moisture	n.a.	17.9	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	500.	200.	41.	ug/kg	1
03761	Naphthalene	91-20-3	< 200.	200.	41.	ug/kg	1
03768	Fluorene	86-73-7	< 200.	200.	41.	ug/kg	1
03775	Phenanthrene	85-01-8	400.	200.	41.	ug/kg	1
03776	Anthracene	120-12-7	< 200.	200.	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	350.	200.	41.	ug/kg	1
03782	Chrysene	218-01-9	360.	200.	41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	680.	200.	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	410.	200.	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	270.	200.	41.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 370.	370.	37.	ug/kg	60.02
05460	Benzene	71-43-2	< 370.	370.	37.	ug/kg	60.02
05461	1,2-Dichloroethane	107-06-2	< 370.	370.	73.	ug/kg	60.02
05466	Toluene	108-88-3	< 370.	370.	73.	ug/kg	60.02
05471	1,2-Dibromoethane	106-93-4	< 370.	370.	73.	ug/kg	60.02
05474	Ethylbenzene	100-41-4	< 370.	370.	73.	ug/kg	60.02
05479	Isopropylbenzene	98-82-8	2,200.	370.	73.	ug/kg	60.02
06301	Xylene (Total)	1330-20-7	< 370.	370.	73.	ug/kg	60.02
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories Sample No. SW 4720660

BH-B164-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 11:00 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B164-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 10:54	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 12:11	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 14:45	Susan McMahon-Luu	60.02
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 15:31	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 15:36	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 15:38	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720661

BH-B157-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 11:30 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B157-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	178.	2.55	0.996	mg/kg	1
00111	Moisture	n.a.	21.7	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,400.	1,100.	210.	ug/kg	1
03761	Naphthalene	91-20-3	< 1,100.	1,100.	210.	ug/kg	1
03768	Fluorene	86-73-7	< 1,100.	1,100.	210.	ug/kg	1
03775	Phenanthrene	85-01-8	< 1,100.	1,100.	210.	ug/kg	1
03776	Anthracene	120-12-7	< 1,100.	1,100.	210.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	1,400.	1,100.	210.	ug/kg	1
03782	Chrysene	218-01-9	1,400.	1,100.	210.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	2,100.	1,100.	210.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,500.	1,100.	210.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 1,100.	1,100.	210.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 240.	240.	24.	ug/kg	38.28
05460	Benzene	71-43-2	< 240.	240.	24.	ug/kg	38.28
05461	1,2-Dichloroethane	107-06-2	< 240.	240.	49.	ug/kg	38.28
05466	Toluene	108-88-3	< 240.	240.	49.	ug/kg	38.28
05471	1,2-Dibromoethane	106-93-4	< 240.	240.	49.	ug/kg	38.28
05474	Ethylbenzene	100-41-4	< 240.	240.	49.	ug/kg	38.28
05479	Isopropylbenzene	98-82-8	< 240.	240.	49.	ug/kg	38.28
06301	Xylene (Total)	1330-20-7	270.	240.	49.	ug/kg	38.28
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories Sample No. SW 4720661

BH-B157-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 11:30 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B157-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 10:58	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 13:06	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 15:31	Susan McMahon-Luu	38.28
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 15:44	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 15:46	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 15:49	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720662

BH-B153-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 12:05 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B153-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	66.3	3.38	1.32	mg/kg	1
00111	Moisture	n.a.	40.8	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	< 280.	280.	56.	ug/kg	1
03761	Naphthalene	91-20-3	< 280.	280.	56.	ug/kg	1
03768	Fluorene	86-73-7	4,200.	280.	56.	ug/kg	1
03775	Phenanthrene	85-01-8	< 280.	280.	56.	ug/kg	1
03776	Anthracene	120-12-7	< 280.	280.	56.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	< 280.	280.	56.	ug/kg	1
03782	Chrysene	218-01-9	< 280.	280.	56.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	< 280.	280.	56.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	< 280.	280.	56.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 280.	280.	56.	ug/kg	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.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 420.	420.	42.	ug/kg	49.5
05460	Benzene	71-43-2	< 420.	420.	42.	ug/kg	49.5
05461	1,2-Dichloroethane	107-06-2	< 420.	420.	84.	ug/kg	49.5
05466	Toluene	108-88-3	< 420.	420.	84.	ug/kg	49.5
05471	1,2-Dibromoethane	106-93-4	< 420.	420.	84.	ug/kg	49.5
05474	Ethylbenzene	100-41-4	< 420.	420.	84.	ug/kg	49.5
05479	Isopropylbenzene	98-82-8	< 420.	420.	84.	ug/kg	49.5
06301	Xylene (Total)	1330-20-7	< 420.	420.	84.	ug/kg	49.5
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720662

BH-B153-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 12:05 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B153-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 11:12	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 18:33	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 15:54	Susan McMahon-Luu	49.5
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 15:53	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 15:56	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 16:00	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720663

BH-B152-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 13:05 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B152-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	27.0	2.32	0.906	mg/kg	1
00111	Moisture	n.a.	15.6	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	< 3,000.	3,000.	590.	ug/kg	5
03761	Naphthalene	91-20-3	< 3,000.	3,000.	590.	ug/kg	5
03768	Fluorene	86-73-7	< 3,000.	3,000.	590.	ug/kg	5
03775	Phenanthrene	85-01-8	< 3,000.	3,000.	590.	ug/kg	5
03776	Anthracene	120-12-7	< 3,000.	3,000.	590.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	< 3,000.	3,000.	590.	ug/kg	5
03782	Chrysene	218-01-9	< 3,000.	3,000.	590.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	< 3,000.	3,000.	590.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	< 3,000.	3,000.	590.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	< 3,000.	3,000.	590.	ug/kg	5
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 200.	200.	20.	ug/kg	33.07
05460	Benzene	71-43-2	460.	200.	20.	ug/kg	33.07
05461	1,2-Dichloroethane	107-06-2	< 200.	200.	39.	ug/kg	33.07
05466	Toluene	108-88-3	< 200.	200.	39.	ug/kg	33.07
05471	1,2-Dibromoethane	106-93-4	< 200.	200.	39.	ug/kg	33.07
05474	Ethylbenzene	100-41-4	240.	200.	39.	ug/kg	33.07
05479	Isopropylbenzene	98-82-8	20,000.	2,000.	390.	ug/kg	330.69
06301	Xylene (Total)	1330-20-7	< 200.	200.	39.	ug/kg	33.07

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720663

BH-B152-030106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 13:05 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B152-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 11:17	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 14:55	Joseph M Gambler	5
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 16:40	Susan McMahon-Luu	330.69
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 18:34	Susan McMahon-Luu	33.07
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 16:02	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 16:05	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 16:07	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720664

BH-B151-030106-0.5-1 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 13:45 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B151-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	198.	10.6	4.14	mg/kg	5
00111	Moisture	n.a.	9.4	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	5,300.	920.	180.	ug/kg	1
03761	Naphthalene	91-20-3	8,600.	920.	180.	ug/kg	1
03768	Fluorene	86-73-7	1,100.	920.	180.	ug/kg	1
03775	Phenanthrene	85-01-8	2,900.	920.	180.	ug/kg	1
03776	Anthracene	120-12-7	< 920.	920.	180.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	2,000.	920.	180.	ug/kg	1
03782	Chrysene	218-01-9	2,400.	920.	180.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,600.	920.	180.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,700.	920.	180.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 920.	920.	180.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 200.	200.	20.	ug/kg	35.92
05460	Benzene	71-43-2	< 200.	200.	20.	ug/kg	35.92
05461	1,2-Dichloroethane	107-06-2	< 200.	200.	40.	ug/kg	35.92
05466	Toluene	108-88-3	< 200.	200.	40.	ug/kg	35.92
05471	1,2-Dibromoethane	106-93-4	< 200.	200.	40.	ug/kg	35.92
05474	Ethylbenzene	100-41-4	< 200.	200.	40.	ug/kg	35.92
05479	Isopropylbenzene	98-82-8	< 200.	200.	40.	ug/kg	35.92
06301	Xylene (Total)	1330-20-7	< 200.	200.	40.	ug/kg	35.92
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720664

BH-B151-030106-0.5-1 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 13:45 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B151-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/08/2006 07:48	Joanne M Gates	5
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 15:49	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 17:03	Susan McMahon-Luu	35.92
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 16:16	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 16:19	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 16:23	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4720665

BH-B154-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 14:15 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

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B154-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	410.	2.29	0.893	mg/kg	1
00111	Moisture	n.a.	13.5	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	15,000.	5,800.	1,200.	ug/kg	10
03761	Naphthalene	91-20-3	6,800.	5,800.	1,200.	ug/kg	10
03768	Fluorene	86-73-7	7,800.	5,800.	1,200.	ug/kg	10
03775	Phenanthrene	85-01-8	31,000.	5,800.	1,200.	ug/kg	10
03776	Anthracene	120-12-7	6,200.	5,800.	1,200.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	5,900.	5,800.	1,200.	ug/kg	10
03782	Chrysene	218-01-9	7,800.	5,800.	1,200.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	< 5,800.	5,800.	1,200.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	< 5,800.	5,800.	1,200.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	< 5,800.	5,800.	1,200.	ug/kg	10
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 160.	160.	16.	ug/kg	26.97
05460	Benzene	71-43-2	3,600.	160.	16.	ug/kg	26.97
05461	1,2-Dichloroethane	107-06-2	< 160.	160.	31.	ug/kg	26.97
05466	Toluene	108-88-3	240.	160.	31.	ug/kg	26.97
05471	1,2-Dibromoethane	106-93-4	< 160.	160.	31.	ug/kg	26.97
05474	Ethylbenzene	100-41-4	1,800.	160.	31.	ug/kg	26.97
05479	Isopropylbenzene	98-82-8	1,800.	160.	31.	ug/kg	26.97
06301	Xylene (Total)	1330-20-7	1,200.	160.	31.	ug/kg	26.97

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories Sample No. SW 4720665

BH-B154-030106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/01/2006 14:15 by MBS

Account Number: 11849

Submitted: 03/02/2006 17:45
Reported: 03/17/2006 at 11:39
Discard: 04/17/2006

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976

B154-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/07/2006 11:27	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	03/03/2006 13:37	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/08/2006 16:44	Joseph M Gambler	10
02308	UST-Soils by 8260B	SW-846 8260B	1	03/07/2006 17:26	Susan McMahon-Luu	26.97
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/03/2006 16:27	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/03/2006 16:30	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/06/2006 20:05	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	03/03/2006 16:36	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/03/2006 19:00	Ashley B Zook	1

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

Lancaster Laboratories

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Analysis Report

Quality Control Summary

Client Name: Langan/Aquaterra Group Number: 980131
Reported: 03/17/06 at 11:39 AM

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: 06062820004B	Sample number(s): 4720657-4720665								
Moisture					100		99-101		
Batch number: 06062SLF026	Sample number(s): 4720657-4720665								
Pyrene	< 170.	170.	33.	ug/kg	94		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	84		70-103		
Fluorene	< 170.	170.	33.	ug/kg	93		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	91		70-107		
Anthracene	< 170.	170.	33.	ug/kg	91		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	93		73-111		
Chrysene	< 170.	170.	33.	ug/kg	94		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	84		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	89		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	91		66-120		
Batch number: 060655708002	Sample number(s): 4720657-4720665								
Lead	< 2.00	2.00	0.780	mg/kg	96		80-120		
Batch number: Q060612AB	Sample number(s): 4720659-4720665								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	98	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	95	98	77-119	3	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	100	101	76-126	1	30
Toluene	< 250.	250.	50.	ug/kg	98	100	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	103	103	77-114	0	30
Ethylbenzene	< 250.	250.	50.	ug/kg	98	100	82-115	3	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	98	100	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	98	101	82-117	3	30
Batch number: X060671AA	Sample number(s): 4720657-4720658								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	97	94	75-125	4	30
Benzene	< 5.	5.	0.5	ug/kg	100	95	77-119	5	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	113	109	76-126	4	30
Toluene	< 5.	5.	1.	ug/kg	96	94	81-116	2	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	96	91	77-114	6	30
Ethylbenzene	< 5.	5.	1.	ug/kg	99	95	82-115	4	30
Isopropylbenzene	< 5.	5.	1.	ug/kg	97	92	79-117	6	30
Xylene (Total)	< 5.	5.	1.	ug/kg	96	93	82-117	4	30

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

MS	MSD	MS/MSD	RPD	BKG	DUP	DUP	Dup RPD

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: Langan/Aquaterra Group Number: 980131
Reported: 03/17/06 at 11:39 AM

Analysis Name	%REC	%REC	Limits	RPD	MAX	Conc	Conc	RPD	Max
Batch number: 06062820004B	Sample number(s): 4720657-4720665 BKG: 4720660								
Moisture						17.9	18.1	1	15
Batch number: 06062SLF026	Sample number(s): 4720657-4720665 UNSPK: P720623								
Pyrene	98	101	38-144	3	30				
Naphthalene	86	88	39-129	3	30				
Fluorene	94	95	47-126	1	30				
Phenanthrene	90	95	44-138	6	30				
Anthracene	88	93	38-142	5	30				
Benzo(a)anthracene	95	96	48-132	2	30				
Chrysene	95	98	46-133	3	30				
Benzo(b)fluoranthene	86	89	40-140	3	30				
Benzo(a)pyrene	89	91	38-142	2	30				
Benzo(g,h,i)perylene	89	92	25-154	3	30				
Batch number: 060655708002	Sample number(s): 4720657-4720665 UNSPK: P720791 BKG: P720791								
Lead	67*	74*	75-125	4	20	15.6	14.0	11	20
Batch number: X060671AA	Sample number(s): 4720657-4720658 UNSPK: 4720657								
Methyl Tertiary Butyl Ether	102		47-130						
Benzene	135*		59-120						
1,2-Dichloroethane	117		62-130						
Toluene	137*		49-132						
1,2-Dibromoethane	99		62-116						
Ethylbenzene	116		50-127						
Isopropylbenzene	101		41-120						
Xylene (Total)	108		44-127						

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: PAHs in Soil by GC/MS
Batch number: 06062SLF026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4720657	91	92	101
4720658	94	93	101
4720659	104	91	100
4720660	90	93	102
4720661	103	104	114
4720662	92	96	97
4720663	96	94	106
4720664	123	88	103
4720665	103	104	111
Blank	90	92	98
LCS	91	92	99
MS	90	93	98
MSD	93	95	101
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060612AB

*- 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 background result was more than four times the spike added.

Quality Control Summary

Client Name: Langan/Aquaterra Group Number: 980131
Reported: 03/17/06 at 11:39 AM

Surrogate Quality Control

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4720659	66*	67*	115	109
4720660	76	75	111	82
4720661	74	73	71	67*
4720662	66*	66*	59*	61*
4720663	72	72	97	72
4720664	79	79	70	100
4720665	78	78	91	103
Blank	90	90	85	89
LCS	92	93	93	95
LCSD	95	97	96	99
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: X060671AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4720657	91	88	89	87
4720658	90	83	91	87
Blank	91	85	91	87
LCS	89	83	91	89
LCSD	89	83	91	88
MS	92	87	106	71
Limits:	71-114	70-109	70-123	70-111

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11849 Group# 980131 Sample # 472065-65

COC # 0114609

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun- Aquaterra/Langan Acct. #:

Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:

Project Manager: Brad Spancake | Jason Hanna (Langan) P.O.#:

Sampler: M. Brad Spancake Quote #:

Name of state where samples were collected: PA

(2) (3) (4) (5) Analyses Requested

For Lab Use Only
FSC:
SCR #:

(6)

Sample Identification	Date Collected	Time Collected	Matrix	# of containers	8260B BTEX, Cumene, MTBE, EDB, EDC	8270C Anthracene, Benzo(a)anthracene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Fluorene, Naphthalene, Phenanthrene, Pyrene	Lead (Total) 6010B	% Moisture	Remarks
BH-B162-030106-1-1.5	3/1/06	0845	X	X				4	MeOH vial # 6648 (4BB)
BH-B160-030106-1-1.5		0940							6653
BH-B161-030106-1.5-2		1020							6647
BH-B164-030106-1.5-2		1100							6652
BH-B157-030106-1-1.5		1130							6651
BH-B153-030106-1.5-2		1205							6646
BH-B152-030106-1.5-2		1305							6645
BH-B151-030106-0.5-1		1345							6656
BH-B154-030106-1-1.5		1415							6649
									Temp 1.8-2.4°C TIB

(7) **Turnaround Time Requested** (TAT) (please circle) Normal Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Date results are needed:

Rush results requested by (please circle): Phone Fax E-mail

Phone #: Fax #:

E-mail address: jhanna@langan.com

(8) **Data Package Options** (please circle if required)

QC Summary, Type I (Tier I), Type II (Tier II), Type III (NJ Red. Del.), Type IV (CLP), Type VI (Raw Data), GLP, Other

SDG Complete? Yes No

Site-specific QC required? Yes (No)

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes (No)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad	3/1/06	1600	Aquaterra Fridge	3/1/06	1600
	3/2	945	Marvin McHallek	3/2/06	9:45
Marvin McHallek	3/2/06	1745			

(9)

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300

Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102.02

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

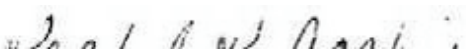
The sample group for this submittal is 983014. Samples arrived at the laboratory on Friday, Mar 24 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4736392	3/23/2006 9:15	BH-27-06-032306-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736393	3/23/2006 10:30	BH-28-06-032306-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736394	3/22/2006 9:30	BH-03-06-032206-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736395	3/22/2006 10:05	BH-02-06-032206-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736396	3/22/2006 12:20	BH-13-06-032206-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736397	3/23/2006 7:50	BH-14-06-032306-0.5-1 Grab Soil Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,



ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

Rachel R. Cochis
Group Leader

Langan
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 5/11/2006 8:36
Submit Date: 3/24/2006 15:50

Analysis Name	Units	4736392 BH-27-06			4736393 BH-28-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	167.	2.26	0.882	200.	2.23	0.868
Moisture	%	12.4	0.50	0.50	12.8	0.50	0.50
Pyrene	ug/kg	2,000.	1,900.	380.	8,900.	960.	190.
Naphthalene	ug/kg	12,000.	1,900.	380.	1,000.	190.	38.
Fluorene	ug/kg	16,000.	1,900.	380.	12,000.	960.	190.
Phenanthrene	ug/kg	36,000.	1,900.	380.	16,000.	960.	190.
Anthracene	ug/kg	3,300.	1,900.	380.	2,500.	190.	38.
Benzo(a)anthracene	ug/kg	< 1,900.	1,900.	380.	4,000.	190.	38.
Chrysene	ug/kg	< 1,900.	1,900.	380.	4,300.	190.	38.
Benzo(b)fluoranthene	ug/kg	< 1,900.	1,900.	380.	6,000.	960.	190.
Benzo(a)pyrene	ug/kg	< 1,900.	1,900.	380.	4,200.	960.	190.
Benzo(g,h,i)perylene	ug/kg	< 1,900.	1,900.	380.	1,900.	190.	38.
Methyl Tertiary Butyl Ether	ug/kg	< 180.	180.	18.	< 380.	380.	38.
Benzene	ug/kg	2,200.	180.	18.	1,300.	380.	38.
1,2-Dichloroethane	ug/kg	< 180.	180.	36.	< 380.	380.	76.
Toluene	ug/kg	< 180.	180.	36.	590.	380.	76.
1,2-Dibromoethane	ug/kg	< 180.	180.	36.	< 380.	380.	76.
Ethylbenzene	ug/kg	1,600.	180.	36.	670.	380.	76.
Isopropylbenzene	ug/kg	9,100.	180.	36.	6,400.	380.	76.
Xylene (Total)	ug/kg	770.	180.	36.	580.	380.	76.

Analysis Name	Units	4736394 BH-03-06			4736395 BH-02-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	1,650.	2.92	1.14	1,260.	3.40	1.33
Moisture	%	33.5	0.50	0.50	43.5	0.50	0.50
Pyrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Naphthalene	ug/kg		n.a.	n.a.		n.a.	n.a.
Fluorene	ug/kg		n.a.	n.a.		n.a.	n.a.
Phenanthrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Anthracene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(a)anthracene	ug/kg		n.a.	n.a.		n.a.	n.a.
Chrysene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(b)fluoranthene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(a)pyrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(g,h,i)perylene	ug/kg		n.a.	n.a.		n.a.	n.a.
Methyl Tertiary Butyl Ether	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzene	ug/kg		n.a.	n.a.		n.a.	n.a.
1,2-Dichloroethane	ug/kg		n.a.	n.a.		n.a.	n.a.
Toluene	ug/kg		n.a.	n.a.		n.a.	n.a.
1,2-Dibromoethane	ug/kg		n.a.	n.a.		n.a.	n.a.
Ethylbenzene	ug/kg		n.a.	n.a.		n.a.	n.a.

** = This limit was used in the evalution of the final result

Langan
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 5/11/2006 8:36
Submit Date: 3/24/2006 15:50

Isopropylbenzene	ug/kg		n.a.	n.a.		n.a.	n.a.
Xylene (Total)	ug/kg		n.a.	n.a.		n.a.	n.a.

Analysis Name	Units	4736396 BH-13-06			4736397 BH-14-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	283.	3.15	1.23	1,040.	2.87	1.12
Moisture	%	38.3	0.50	0.50	33.1	0.50	0.50
Pyrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Naphthalene	ug/kg		n.a.	n.a.		n.a.	n.a.
Fluorene	ug/kg		n.a.	n.a.		n.a.	n.a.
Phenanthrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Anthracene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(a)anthracene	ug/kg		n.a.	n.a.		n.a.	n.a.
Chrysene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(b)fluoranthene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(a)pyrene	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzo(g,h,i)perylene	ug/kg		n.a.	n.a.		n.a.	n.a.
Methyl Tertiary Butyl Ether	ug/kg		n.a.	n.a.		n.a.	n.a.
Benzene	ug/kg		n.a.	n.a.		n.a.	n.a.
1,2-Dichloroethane	ug/kg		n.a.	n.a.		n.a.	n.a.
Toluene	ug/kg		n.a.	n.a.		n.a.	n.a.
1,2-Dibromoethane	ug/kg		n.a.	n.a.		n.a.	n.a.
Ethylbenzene	ug/kg		n.a.	n.a.		n.a.	n.a.
Isopropylbenzene	ug/kg		n.a.	n.a.		n.a.	n.a.
Xylene (Total)	ug/kg		n.a.	n.a.		n.a.	n.a.

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4736392	**BH-27-06-032306-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0252	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/3/06 2101	William T Parker	10
02308	UST-Soils by 8260B	SW-846 8260B	1	3/28/06 1733	Susan McMahon-Luu	31.49
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/27/06 1508	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/27/06 1510	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/27/06 1513	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/31/06 1030	Amanda W Herr	1
4736393	**BH-28-06-032306-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0255	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/2/06 1930	Mark A Clark	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/3/06 2154	William T Parker	5
02308	UST-Soils by 8260B	SW-846 8260B	1	3/28/06 1756	Susan McMahon-Luu	66.49
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/27/06 1514	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/27/06 1516	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/27/06 1517	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/31/06 1030	Amanda W Herr	1
4736394	**BH-03-06-032206-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0259	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1
4736395	**BH-02-06-032206-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0303	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1
4736396	**BH-13-06-032206-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0306	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1
4736397	**BH-14-06-032306-0.5-1 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0310	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/28/06 0840	Megersa Deyessa	1

Client Name: Langan Group Number: 983014

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 060875708001		Sample number(s): 4736392-4736397							
Lead	< 2.00	2.00	0.780	mg/kg	98		84-112		
Batch number: 06087820005A		Sample number(s): 4736392-4736397							
Moisture					100		99-101		
Batch number: 06089SLH026		Sample number(s): 4736392-4736393							
Pyrene	< 170.	170.	33.	ug/kg	103		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	82		70-103		
Fluorene	< 170.	170.	33.	ug/kg	96		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	92		70-107		
Anthracene	< 170.	170.	33.	ug/kg	89		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	98		73-111		
Chrysene	< 170.	170.	33.	ug/kg	99		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	106		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	105		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	109		66-120		
Batch number: Q060871AA		Sample number(s): 4736392-4736393							
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	100	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	100	97	77-119	4	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	108	104	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	103	101	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	104	102	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	106	104	82-115	2	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	106	104	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	105	103	82-117	3	30

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

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
Batch number: 060875708001	Sample number(s): 4736392-4736397 UNSPK: P736439 BKG: P736439								
Lead	100	103	75-125	3	20	2.48	2.65	7 (1)	20
Batch number: 06087820005A	Sample number(s): 4736392-4736397 BKG: P736442								
Moisture						19.8	19.8	0	15
Batch number: 06089SLH026	Sample number(s): 4736392-4736393 UNSPK: P738884								
Pyrene	94	97	38-144	2	30				
Naphthalene	87	88	39-129	2	30				
Fluorene	91	92	47-126	1	30				
Phenanthrene	96	97	44-138	0	30				
Anthracene	95	94	38-142	1	30				
Benzo(a)anthracene	97	98	48-132	1	30				
Chrysene	100	100	46-133	0	30				
Benzo(b)fluoranthene	98	102	40-140	4	30				
Benzo(a)pyrene	102	103	38-142	2	30				
Benzo(g,h,i)perylene	93	95	25-154	2	30				

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: PAHs in Soil by GC/MS
Batch number: 06089SLH026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4736392	255*	91	85
4736393	98	93	97
Blank	94	92	98
LCS	96	92	102
MS	107	93	96
MSD	110	94	98
Limits:	47-128	55-123	51-158

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name: UST-Soils by 8260B
Batch number: Q060871AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4736392	78	75	87	73
4736393	161*	159*	159*	180*
Blank	106	104	104	105
LCS	103	100	105	108
LCSD	101	98	104	105
Limits:	71-114	70-109	70-123	70-111

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4736392 BH-27-06-032306-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736393 BH-28-06-032306-1-1.5 Grab Soil Sample

00111 Moisture
"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.

02308 UST-Soils by 8260B
Surrogate recoveries were outside of QC limits for the GC/MS volatile fraction. There was insufficient sample volume to repeat the analysis.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736394 BH-03-06-032206-1.5-2 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736395 BH-02-06-032206-1.5-2 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736396 BH-13-06-032206-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736397 BH-14-06-032306-0.5-1 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

ANALYTICAL RESULTS

Prepared for:

Langan/Aquaterra
2700 Kelly Road
Suite 200
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 980131. Samples arrived at the laboratory on Thursday, Mar 2 2006.
The project for this group is SUN: Aquaterra Philadelphia, PA AOI-6.
The PO# for this sample group is 2574601.

Sample No.	Collected	Client Description
4720657	3/1/2006 8:45	BH-B162-030106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720658	3/1/2006 9:40	BH-B160-030106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720659	3/1/2006 10:20	BH-B161-030106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720660	3/1/2006 11:00	BH-B164-030106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720661	3/1/2006 11:30	BH-B157-030106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720662	3/1/2006 12:05	BH-B153-030106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720663	3/1/2006 13:05	BH-B152-030106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720664	3/1/2006 13:45	BH-B151-030106-0.5-1 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4720665	3/1/2006 14:15	BH-B154-030106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO SUN: Aquaterra Tech. Attn: Brad Spancake

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

ANALYTICAL RESULTS

Prepared for:

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Lancaster, PA 17605-2425

Respectfully Submitted,

Rachel R. Cochis
Group Leader

Langan/Aquaterra
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 3/17/2006 11:39
Submit Date: 3/2/2006 17:45

Analysis Name	Units	4720657 BH-B162- Result	LOQ**	MDL	4720658 BH-B160- Result	LOQ**	MDL
Lead	mg/kg	584.	2.09	0.813	30.8	2.54	0.992
Moisture	%	6.9	0.50	0.50	22.9	0.50	0.50
Pyrene	ug/kg	320.	180.	36.	< 220.	220.	43.
Naphthalene	ug/kg	< 180.	180.	36.	< 220.	220.	43.
Fluorene	ug/kg	< 180.	180.	36.	< 220.	220.	43.
Phenanthrene	ug/kg	< 180.	180.	36.	< 220.	220.	43.
Anthracene	ug/kg	< 180.	180.	36.	< 220.	220.	43.
Benzo(a)anthracene	ug/kg	200.	180.	36.	< 220.	220.	43.
Chrysene	ug/kg	250.	180.	36.	< 220.	220.	43.
Benzo(b)fluoranthene	ug/kg	290.	180.	36.	< 220.	220.	43.
Benzo(a)pyrene	ug/kg	220.	180.	36.	< 220.	220.	43.
Benzo(g,h,i)perylene	ug/kg	< 180.	180.	36.	< 220.	220.	43.
Methyl Tertiary Butyl Ether	ug/kg	< 5.	5.	0.5	< 5.	5.	0.5
Benzene	ug/kg	< 5.	5.	0.5	< 5.	5.	0.5
1,2-Dichloroethane	ug/kg	< 5.	5.	1.	< 5.	5.	0.9
Toluene	ug/kg	< 5.	5.	1.	< 5.	5.	0.9
1,2-Dibromoethane	ug/kg	< 5.	5.	1.	< 5.	5.	0.9
Ethylbenzene	ug/kg	< 5.	5.	1.	< 5.	5.	0.9
Isopropylbenzene	ug/kg	< 5.	5.	1.	< 5.	5.	0.9
Xylene (Total)	ug/kg	< 5.	5.	1.	< 5.	5.	0.9

Analysis Name	Units	4720659 BH-B161- Result	LOQ**	MDL	4720660 BH-B164- Result	LOQ**	MDL
Lead	mg/kg	70.1	2.48	0.966	18.5	2.41	0.941
Moisture	%	21.6	0.50	0.50	17.9	0.50	0.50
Pyrene	ug/kg	2,100.	210.	43.	500.	200.	41.
Naphthalene	ug/kg	340.	210.	43.	< 200.	200.	41.
Fluorene	ug/kg	< 210.	210.	43.	< 200.	200.	41.
Phenanthrene	ug/kg	410.	210.	43.	400.	200.	41.
Anthracene	ug/kg	360.	210.	43.	< 200.	200.	41.
Benzo(a)anthracene	ug/kg	1,800.	210.	43.	350.	200.	41.
Chrysene	ug/kg	2,100.	210.	43.	360.	200.	41.
Benzo(b)fluoranthene	ug/kg	2,700.	210.	43.	680.	200.	41.
Benzo(a)pyrene	ug/kg	2,200.	210.	43.	410.	200.	41.
Benzo(g,h,i)perylene	ug/kg	1,300.	210.	43.	270.	200.	41.
Methyl Tertiary Butyl Ether	ug/kg	< 440.	440.	44.	< 370.	370.	37.
Benzene	ug/kg	< 440.	440.	44.	< 370.	370.	37.
1,2-Dichloroethane	ug/kg	< 440.	440.	88.	< 370.	370.	73.
Toluene	ug/kg	< 440.	440.	88.	< 370.	370.	73.
1,2-Dibromoethane	ug/kg	< 440.	440.	88.	< 370.	370.	73.
Ethylbenzene	ug/kg	< 440.	440.	88.	< 370.	370.	73.

** = This limit was used in the evalution of the final result

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Isopropylbenzene	ug/kg	2,200.	440.	88.	2,200.	370.	73.
Xylene (Total)	ug/kg	5,100.	440.	88.	< 370.	370.	73.

Analysis Name	Units	4720661 BH-B157-			4720662 BH-B153-		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	178.	2.55	0.996	66.3	3.38	1.32
Moisture	%	21.7	0.50	0.50	40.8	0.50	0.50
Pyrene	ug/kg	1,400.	1,100.	210.	< 280.	280.	56.
Naphthalene	ug/kg	< 1,100.	1,100.	210.	< 280.	280.	56.
Fluorene	ug/kg	< 1,100.	1,100.	210.	4,200.	280.	56.
Phenanthrene	ug/kg	< 1,100.	1,100.	210.	< 280.	280.	56.
Anthracene	ug/kg	< 1,100.	1,100.	210.	< 280.	280.	56.
Benzo(a)anthracene	ug/kg	1,400.	1,100.	210.	< 280.	280.	56.
Chrysene	ug/kg	1,400.	1,100.	210.	< 280.	280.	56.
Benzo(b)fluoranthene	ug/kg	2,100.	1,100.	210.	< 280.	280.	56.
Benzo(a)pyrene	ug/kg	1,500.	1,100.	210.	< 280.	280.	56.
Benzo(g,h,i)perylene	ug/kg	< 1,100.	1,100.	210.	< 280.	280.	56.
Methyl Tertiary Butyl Ether	ug/kg	< 240.	240.	24.	< 420.	420.	42.
Benzene	ug/kg	< 240.	240.	24.	< 420.	420.	42.
1,2-Dichloroethane	ug/kg	< 240.	240.	49.	< 420.	420.	84.
Toluene	ug/kg	< 240.	240.	49.	< 420.	420.	84.
1,2-Dibromoethane	ug/kg	< 240.	240.	49.	< 420.	420.	84.
Ethylbenzene	ug/kg	< 240.	240.	49.	< 420.	420.	84.
Isopropylbenzene	ug/kg	< 240.	240.	49.	< 420.	420.	84.
Xylene (Total)	ug/kg	270.	240.	49.	< 420.	420.	84.

Analysis Name	Units	4720663 BH-B152-			4720664 BH-B151-		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	27.0	2.32	0.906	198.	10.6	4.14
Moisture	%	15.6	0.50	0.50	9.4	0.50	0.50
Pyrene	ug/kg	< 3,000.	3,000.	590.	5,300.	920.	180.
Naphthalene	ug/kg	< 3,000.	3,000.	590.	8,600.	920.	180.
Fluorene	ug/kg	< 3,000.	3,000.	590.	1,100.	920.	180.
Phenanthrene	ug/kg	< 3,000.	3,000.	590.	2,900.	920.	180.
Anthracene	ug/kg	< 3,000.	3,000.	590.	< 920.	920.	180.
Benzo(a)anthracene	ug/kg	< 3,000.	3,000.	590.	2,000.	920.	180.
Chrysene	ug/kg	< 3,000.	3,000.	590.	2,400.	920.	180.
Benzo(b)fluoranthene	ug/kg	< 3,000.	3,000.	590.	1,600.	920.	180.
Benzo(a)pyrene	ug/kg	< 3,000.	3,000.	590.	1,700.	920.	180.
Benzo(g,h,i)perylene	ug/kg	< 3,000.	3,000.	590.	< 920.	920.	180.
Methyl Tertiary Butyl Ether	ug/kg	< 200.	200.	20.	< 200.	200.	20.
Benzene	ug/kg	460.	200.	20.	< 200.	200.	20.
1,2-Dichloroethane	ug/kg	< 200.	200.	39.	< 200.	200.	40.
Toluene	ug/kg	< 200.	200.	39.	< 200.	200.	40.

** = This limit was used in the evalution of the final result

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1,2-Dibromoethane	ug/kg	< 200.	200.	39.	< 200.	200.	40.
Ethylbenzene	ug/kg	240.	200.	39.	< 200.	200.	40.
Isopropylbenzene	ug/kg	20,000.	2,000.	390.	< 200.	200.	40.
Xylene (Total)	ug/kg	< 200.	200.	39.	< 200.	200.	40.

Analysis Name	Units	4720665 BH-B154- Result	LOQ**	MDL
Lead	mg/kg	410.	2.29	0.893
Moisture	%	13.5	0.50	0.50
Pyrene	ug/kg	15,000.	5,800.	1,200.
Naphthalene	ug/kg	6,800.	5,800.	1,200.
Fluorene	ug/kg	7,800.	5,800.	1,200.
Phenanthrene	ug/kg	31,000.	5,800.	1,200.
Anthracene	ug/kg	6,200.	5,800.	1,200.
Benzo(a)anthracene	ug/kg	5,900.	5,800.	1,200.
Chrysene	ug/kg	7,800.	5,800.	1,200.
Benzo(b)fluoranthene	ug/kg	< 5,800.	5,800.	1,200.
Benzo(a)pyrene	ug/kg	< 5,800.	5,800.	1,200.
Benzo(g,h,i)perylene	ug/kg	< 5,800.	5,800.	1,200.
Methyl Tertiary Butyl Ether	ug/kg	< 160.	160.	16.
Benzene	ug/kg	3,600.	160.	16.
1,2-Dichloroethane	ug/kg	< 160.	160.	31.
Toluene	ug/kg	240.	160.	31.
1,2-Dibromoethane	ug/kg	< 160.	160.	31.
Ethylbenzene	ug/kg	1,800.	160.	31.
Isopropylbenzene	ug/kg	1,800.	160.	31.
Xylene (Total)	ug/kg	1,200.	160.	31.

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4720657	**BH-B162-030106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1039	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 0927	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/8/06 1836	Kenneth L Boley Jr	0.96
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1448	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1451	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1459	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720658	**BH-B160-030106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1044	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1022	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/8/06 1900	Kenneth L Boley Jr	0.71
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1504	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1509	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1512	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720659	**BH-B161-030106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1049	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1117	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1400	Susan McMahon-Luu	68.87
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1517	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1520	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1528	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720660	**BH-B164-030106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1054	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1211	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1445	Susan McMahon-Luu	60.02
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1531	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1536	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1538	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720661	**BH-B157-030106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1058	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1306	Joseph M Gambler	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1531	Susan McMahon-Luu	38.28
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1544	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1546	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1549	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720662	**BH-B153-030106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1112	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1833	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1554	Susan McMahon-Luu	49.5
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1553	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1556	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1600	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720663	**BH-B152-030106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1117	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1455	Joseph M Gambler	5
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1640	Susan McMahon-Luu	330.69
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1834	Susan McMahon-Luu	33.07
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1602	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1605	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1607	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720664	**BH-B151-030106-0.5-1 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/8/06 0748	Joanne M Gates	5
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1549	Joseph M Gambler	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1703	Susan McMahon-Luu	35.92
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1616	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1619	Eric L Vera	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1623	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1
4720665	**BH-B154-030106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/7/06 1127	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	3/3/06 1337	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/8/06 1644	Joseph M Gambler	10
02308	UST-Soils by 8260B	SW-846 8260B	1	3/7/06 1726	Susan McMahon-Luu	26.97
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/3/06 1627	Eric L Vera	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/3/06 1630	Eric L Vera	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/6/06 2005	Annamaria Stipkovits	1
07579	GC/MS-Field PreservedMeOH-NC	SW-846 5035	1	3/3/06 1636	Eric L Vera	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/3/06 1900	Ashley B Zook	1

Client Name: Langan/Aquaterra Group Number: 980131

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 06062820004B	Sample number(s): 4720657-4720665								
Moisture					100		99-101		
Batch number: 06062SLF026	Sample number(s): 4720657-4720665								
Pyrene	< 170.	170.	33.	ug/kg	94		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	84		70-103		
Fluorene	< 170.	170.	33.	ug/kg	93		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	91		70-107		
Anthracene	< 170.	170.	33.	ug/kg	91		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	93		73-111		
Chrysene	< 170.	170.	33.	ug/kg	94		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	84		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	89		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	91		66-120		
Batch number: 060655708002	Sample number(s): 4720657-4720665								
Lead	< 2.00	2.00	0.780	mg/kg	96		80-120		
Batch number: Q060612AB	Sample number(s): 4720659-4720665								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	98	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	95	98	77-119	3	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	100	101	76-126	1	30
Toluene	< 250.	250.	50.	ug/kg	98	100	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	103	103	77-114	0	30
Ethylbenzene	< 250.	250.	50.	ug/kg	98	100	82-115	3	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	98	100	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	98	101	82-117	3	30
Batch number: X060671AA	Sample number(s): 4720657-4720658								

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	97	94	75-125	4	30
Benzene	< 5.	5.	0.5	ug/kg	100	95	77-119	5	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	113	109	76-126	4	30
Toluene	< 5.	5.	1.	ug/kg	96	94	81-116	2	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	96	91	77-114	6	30
Ethylbenzene	< 5.	5.	1.	ug/kg	99	95	82-115	4	30
Isopropylbenzene	< 5.	5.	1.	ug/kg	97	92	79-117	6	30
Xylene (Total)	< 5.	5.	1.	ug/kg	96	93	82-117	4	30

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: 06062820004B	Sample number(s): 4720657-4720665 BKG: 4720660								
Moisture						17.9	18.1	1	15
Batch number: 06062SLF026	Sample number(s): 4720657-4720665 UNSPK: P720623								
Pyrene	98	101	38-144	3	30				
Naphthalene	86	88	39-129	3	30				
Fluorene	94	95	47-126	1	30				
Phenanthrene	90	95	44-138	6	30				
Anthracene	88	93	38-142	5	30				
Benzo(a)anthracene	95	96	48-132	2	30				
Chrysene	95	98	46-133	3	30				
Benzo(b)fluoranthene	86	89	40-140	3	30				
Benzo(a)pyrene	89	91	38-142	2	30				
Benzo(g,h,i)perylene	89	92	25-154	3	30				
Batch number: 060655708002	Sample number(s): 4720657-4720665 UNSPK: P720791 BKG: P720791								
Lead	67*	74*	75-125	4	20	15.6	14.0	11	20
Batch number: X060671AA	Sample number(s): 4720657-4720658 UNSPK: 4720657								
Methyl Tertiary Butyl Ether	102		47-130						
Benzene	135*		59-120						
1,2-Dichloroethane	117		62-130						
Toluene	137*		49-132						
1,2-Dibromoethane	99		62-116						

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Ethylbenzene	116	50-127
Isopropylbenzene	101	41-120
Xylene (Total)	108	44-127

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: PAHs in Soil by GC/MS
Batch number: 06062SLF026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4720657	91	92	101
4720658	94	93	101
4720659	104	91	100
4720660	90	93	102
4720661	103	104	114
4720662	92	96	97
4720663	96	94	106
4720664	123	88	103
4720665	103	104	111
Blank	90	92	98
LCS	91	92	99
MS	90	93	98
MSD	93	95	101
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060612AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4720659	66*	67*	115	109
4720660	76	75	111	82
4720661	74	73	71	67*
4720662	66*	66*	59*	61*
4720663	72	72	97	72
4720664	79	79	70	100
4720665	78	78	91	103
Blank	90	90	85	89
LCS	92	93	93	95
LCSD	95	97	96	99
Limits:	71-114	70-109	70-123	70-111

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name: UST-Soils by 8260B
Batch number: X060671AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4720657	91	88	89	87
4720658	90	83	91	87
Blank	91	85	91	87
LCS	89	83	91	89
LCSD	89	83	91	88
MS	92	87	106	71
Limits:	71-114	70-109	70-123	70-111

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4720657 BH-B162-030106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720658 BH-B160-030106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720659 BH-B161-030106-1.5-2 Grab Soil Sample

00111 Moisture
"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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720660 BH-B164-030106-1.5-2 Grab Soil Sample

00111 Moisture

"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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720661 BH-B157-030106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

07804 PAHs in Soil by GC/MS
Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720662 BH-B153-030106-1.5-2 Grab Soil Sample

00111 Moisture
"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.

07804 PAHs in Soil by GC/MS
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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720663 BH-B152-030106-1.5-2 Grab Soil Sample

00111 Moisture

"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.

07804 PAHs in Soil by GC/MS
Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720664 BH-B151-030106-0.5-1 Grab Soil Sample

00111 Moisture
"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.

07804 PAHs in Soil by GC/MS
Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4720665 BH-B154-030106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

07804 PAHs in Soil by GC/MS
Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

Commonwealth of Pennsylvania Lab Certification No. 36-037

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

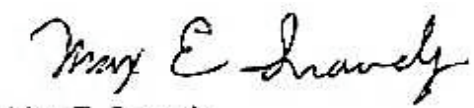
The sample group for this submittal is 983497. Samples arrived at the laboratory on Wednesday, Mar 29 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4739180	3/22/2006 9:30	BH-03-06-032206-1.5-2 Grab Soil Sample TCLP NON-VOLATILE EXTRACTION SUN: Philadelphia Refinery AOI-6
4739181	3/22/2006 10:05	BH-02-06-032206-1.5-2 Grab Soil Sample TCLP NON-VOLATILE EXTRACTION SUN: Philadelphia Refinery AOI-6
4739182	3/23/2006 7:50	BH-14-06-032306-0.5-1 Grab Soil Sample TCLP NON-VOLATILE EXTRACTION SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,



Max E. Snavely

ANALYTICAL RESULTS

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

Max E. Shavely
Senior Specialist

Langan
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 4/10/2006 12:13
Submit Date: 3/29/2006 15:30

Analysis Name	Units	4739180 BH-03-06			4739181 BH-02-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/l	0.0901	0.0200	0.0084	0.240	0.0200	0.0084

Analysis Name	Units	4739182 BH-14-06		
		Result	LOQ**	MDL
Lead	mg/l	1.12	0.0200	0.0084

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4739180	**BH-03-06-032206-1.5-2 Grab Soil Sample**					
07055	Lead	SW-846 6010B	1	4/7/06 1239	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	4/5/06 1205	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	4/7/06 0250	Helen L Schaeffer	1
4739181	**BH-02-06-032206-1.5-2 Grab Soil Sample**					
07055	Lead	SW-846 6010B	1	4/7/06 1317	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	4/5/06 1205	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	4/7/06 0250	Helen L Schaeffer	1
4739182	**BH-14-06-032306-0.5-1 Grab Soil Sample**					
07055	Lead	SW-846 6010B	1	4/7/06 1322	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	4/5/06 1205	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	4/7/06 0250	Helen L Schaeffer	1

Client Name: Langan Group Number: 983497

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 060975705004	Sample number(s): 4739180-4739182								
Lead	< 0.0200	0.0200	0.0084	mg/l	109		90-113		

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: 060975705004	Sample number(s): 4739180-4739182 UNSPK: 4739180 BKG: 4739180								
Lead	109	112	75-125	1	20	0.0901	0.0894	1 (1)	20

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4739180 BH-03-06-032206-1.5-2 Grab Soil Sample

07055 Lead

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

4739181 BH-02-06-032206-1.5-2 Grab Soil Sample

07055 Lead

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

4739182 BH-14-06-032306-0.5-1 Grab Soil Sample

07055 Lead

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the

metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 982662. Samples arrived at the laboratory on Wednesday, Mar 22 2006.
The project for this group is SUN: Philadelphia Refinery AOF-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4734411		Trip Blank Water Sample SUN: Philadelphia Refinery AOF-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Robin C. Runkle
Senior Specialist

Langan
Project: SUN: Philadelphia Refinery AOF-6
SDG:

Report Date: 3/31/2006 10:21
Submit Date: 3/22/2006 16:15

Analysis Name	Units	4734411 Trip Bla Result	LOQ**	MDL
Methyl Tertiary Butyl Ether	ug/l	< 5.	5.	0.5
Benzene	ug/l	< 5.	5.	0.5
1,2-Dichloroethane	ug/l	< 5.	5.	1.
Toluene	ug/l	< 5.	5.	0.7
1,2-Dibromoethane	ug/l	< 5.	5.	1.
Ethylbenzene	ug/l	< 5.	5.	0.8
Isopropylbenzene	ug/l	< 5.	5.	1.
Xylene (Total)	ug/l	< 5.	5.	0.8

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4734411	**Trip Blank Water Sample**					
02302	UST-Waters by 8260B	SW-846 8260B	1	3/27/06 1103	Emiley A King	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	3/27/06 1103	Emiley A King	1

Client Name: Langan Group Number: 982662

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: T060861AA		Sample number(s): 4734411							
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	99	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	101	100	85-117	0	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	110	109	77-132	2	30
Toluene	< 5.	5.	0.7	ug/l	95	96	85-115	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/l	100	98	81-114	1	30
Ethylbenzene	< 5.	5.	0.8	ug/l	97	95	82-119	2	30
Isopropylbenzene	< 5.	5.	1.	ug/l	104	103	80-120	0	30
Xylene (Total)	< 5.	5.	0.8	ug/l	97	97	83-113	0	30

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: T060861AA	Sample number(s): 4734411 UNSPK: P734856								
Methyl Tertiary Butyl Ether	102		69-127						
Benzene	109		83-128						
1,2-Dichloroethane	115		70-143						
Toluene	101		83-127						
1,2-Dibromoethane	101		78-120						
Ethylbenzene	103		82-129						
Isopropylbenzene	112		81-130						
Xylene (Total)	104		82-130						

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-Waters by 8260B

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Batch number: T060861AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734411	95	94	94	96
Blank	98	94	95	97
LCS	97	95	95	100
LCSD	96	96	95	98
MS	97	97	96	99
Limits:	80-116	77-113	80-113	78-113

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4734411 Trip Blank Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 983432. Samples arrived at the laboratory on Wednesday, Mar 29 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4738884	3/24/2006 9:45	BH-26-06-032406-0.5-1 Grab Soil Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Julie A. Slaughenhoupt
Specialist

Langan
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 4/6/2006 23:14
Submit Date: 3/29/2006 10:55

Analysis Name	Units	4738884 BH-26-06 Result	LOQ**	MDL
Lead	mg/kg	32.6	2.15	0.840
Moisture	%	9.0	0.50	0.50
Pyrene	ug/kg	300.	180.	37.
Naphthalene	ug/kg	< 180.	180.	37.
Fluorene	ug/kg	< 180.	180.	37.
Phenanthrene	ug/kg	210.	180.	37.
Anthracene	ug/kg	< 180.	180.	37.
Benzo(a)anthracene	ug/kg	< 180.	180.	37.
Chrysene	ug/kg	< 180.	180.	37.
Benzo(b)fluoranthene	ug/kg	< 180.	180.	37.
Benzo(a)pyrene	ug/kg	< 180.	180.	37.
Benzo(g,h,i)perylene	ug/kg	< 180.	180.	37.
Methyl Tertiary Butyl Ether	ug/kg	< 180.	180.	18.
Benzene	ug/kg	180,000.	18,000.	1,800.
1,2-Dichloroethane	ug/kg	< 180.	180.	36.
Toluene	ug/kg	260,000.	18,000.	3,600.
1,2-Dibromoethane	ug/kg	< 180.	180.	36.
Ethylbenzene	ug/kg	2,700.	180.	36.
Isopropylbenzene	ug/kg	800,000.	18,000.	3,600.
Xylene (Total)	ug/kg	9,300.	180.	36.

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4738884	**BH-26-06-032406-0.5-1 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/31/06 0833	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	4/3/06 1811	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/2/06 1600	Mark A Clark	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/31/06 0233	Lauren C Marzario	32.94
02308	UST-Soils by 8260B	SW-846 8260B	1	3/31/06 0817	Lauren C Marzario	3293.81
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/29/06 1855	Justin M Bowers	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/29/06 1856	Justin M Bowers	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/30/06 2025	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/29/06 1855	Justin M Bowers	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/31/06 1030	Amanda W Herr	1

Client Name: Langan Group Number: 983432

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 060895708005		Sample number(s): 4738884							
Lead	< 2.00	2.00	0.780	mg/kg	97		84-112		
Batch number: 06089SLH026		Sample number(s): 4738884							
Pyrene	< 170.	170.	33.	ug/kg	103		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	82		70-103		
Fluorene	< 170.	170.	33.	ug/kg	96		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	92		70-107		
Anthracene	< 170.	170.	33.	ug/kg	89		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	98		73-111		
Chrysene	< 170.	170.	33.	ug/kg	99		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	106		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	105		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	109		66-120		
Batch number: 06093820005B		Sample number(s): 4738884							
Moisture					100		99-101		
Batch number: Q060871AB		Sample number(s): 4738884							
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	100	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	100	97	77-119	4	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	108	104	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	103	101	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	104	102	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	106	104	82-115	2	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	106	104	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	105	103	82-117	3	30

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

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
Batch number: 060895708005	Sample number(s): 4738884 UNSPK: P739811 BKG: P739811								
Lead	102	89	75-125	7	20	11.6	13.3	14	20
Batch number: 06089SLH026	Sample number(s): 4738884 UNSPK: 4738884								
Pyrene	94	97	38-144	2	30				
Naphthalene	87	88	39-129	2	30				
Fluorene	91	92	47-126	1	30				
Phenanthrene	96	97	44-138	0	30				
Anthracene	95	94	38-142	1	30				
Benzo(a)anthracene	97	98	48-132	1	30				
Chrysene	100	100	46-133	0	30				
Benzo(b)fluoranthene	98	102	40-140	4	30				
Benzo(a)pyrene	102	103	38-142	2	30				
Benzo(g,h,i)perylene	93	95	25-154	2	30				
Batch number: 06093820005B	Sample number(s): 4738884 BKG: P738536								
Moisture						81.6	81.7	0	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: PAHs in Soil by GC/MS
Batch number: 06089SLH026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4738884	110	95	107
Blank	94	92	98
LCS	96	92	102
MS	107	93	96
MSD	110	94	98
Limits:	47-128	55-123	51-158

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Analysis Name: UST-Soils by 8260B
Batch number: Q060871AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4738884	77	77	76	94
Blank	107	106	104	102
LCS	103	100	105	108
LCSD	101	98	104	105
Limits:	71-114	70-109	70-123	70-111

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4738884 BH-26-06-032406-0.5-1 Grab Soil Sample

00111 Moisture

"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Lancaster Laboratories Analytical Report
2425 New Holland Pike, Lancaster, PA 17603

Sample Number: SW 4736394

Account: 10132

BH-03-06-032206-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

Collected: 03/22/2006 09:30 by MBS
Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 10:06
B0306

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,650.	2.92	1.14	mg/kg	1
00111	Moisture	n.a.	33.5	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 02:59	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1

Sample Number: SW 4736395

Account: 10132

BH-02-06-032206-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

Collected: 03/22/2006 10:05 by MBS
Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 10:06
B0206

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,260.	3.40	1.33	mg/kg	1
00111	Moisture	n.a.	43.5	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 03:03	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1

Sample Number: SW 4736397

Account: 10132

*This limit was used to evaluate the final result

Lancaster Laboratories Analytical Report

2425 New Holland Pike, Lancaster, PA 17603

Sample Number: SW 4736397

BH-14-06-032306-0.5-1 Grab Soil Sample

SUN: Philadelphia Refinery AOI-6

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

Collected: 03/23/2006 07:50 by MBS
Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 10:06
B1406

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,040.	2.87	1.12	mg/kg	1
00111	Moisture	n.a.	33.1	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 03:10	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1

*This limit was used to evaluate the final result

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

Partial Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lanacaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 983014. Samples arrived at the laboratory on Friday, Mar 24 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4736394	3/22/2006 9:30	BH-03-06-032206-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736395	3/22/2006 10:05	BH-02-06-032206-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4736397	3/23/2006 7:50	BH-14-06-032306-0.5-1 Grab Soil Sample SUN: Philadelphia Refinery AOI-6

0 COPIES TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
0 COPIES TO	Langan	Attn: Jason Hanna
0 COPIES TO	Langan	Attn: Joseph Catricks

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,

Partial Report

Lancaster Laboratories

Analytical Report

Langan
Project: SUN: Philadelphia Refinery AOI-6

Report Date: 5/11/2006 10:05
Submit Date: 3/24/2006 15:50

Analysis Name	Units	4736394 BH-03-06			4736395 BH-02-06		
		Result	LOQ*	MDL	Result	LOQ*	MDL
Lead	mg/kg	1,650.	2.92	1.14	1,260.	3.40	1.33
Moisture	%	33.5	0.50	0.50	43.5	0.50	0.50

Analysis Name	Units	4736397 BH-14-06		
		Result	LOQ*	MDL
Lead	mg/kg	1,040.	2.87	1.12
Moisture	%	33.1	0.50	0.50

Partial Report

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4736394	**BH-03-06-032206-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0259	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
4736395	**BH-02-06-032206-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0303	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1
4736397	**BH-14-06-032306-0.5-1 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/29/06 0310	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/29/06 0929	William C Schwebel	1

Comments

4736394 BH-03-06-032206-1.5-2 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736395 BH-02-06-032206-1.5-2 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4736397 BH-14-06-032306-0.5-1 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Lancaster Laboratories

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 983497. Samples arrived at the laboratory on Wednesday, March 29, 2006. The PO# for this group is PHILADELPHIA REFINERY.

Client Description	Lancaster Labs Number
BH-03-06-032206-1.5-2 Grab Soil Sample	4739180
BH-02-06-032206-1.5-2 Grab Soil Sample	4739181
BH-14-06-032306-0.5-1 Grab Soil Sample	4739182

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Max E. Snavely
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. TL 4739180

BH-03-06-032206-1.5-2 Grab Soil Sample
TCLP NON-VOLATILE EXTRACTION
SUN: Philadelphia Refinery AOI-6

Collected:03/22/2006 09:30 by MBS

Account Number: 10132

Submitted: 03/29/2006 15:30
Reported: 04/10/2006 at 12:13
Discard: 05/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07055	Lead	7439-92-1	0.0901	0.0200	0.0084	mg/l	1

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07055	Lead	SW-846 6010B	1	04/07/2006 12:39	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	04/05/2006 12:05	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	04/07/2006 02:50	Helen L Schaeffer	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. TL 4739181

BH-02-06-032206-1.5-2 Grab Soil Sample
TCLP NON-VOLATILE EXTRACTION
SUN: Philadelphia Refinery AOI-6

Collected:03/22/2006 10:05 by MBS

Account Number: 10132

Submitted: 03/29/2006 15:30
Reported: 04/10/2006 at 12:13
Discard: 05/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07055	Lead	7439-92-1	0.240	0.0200	0.0084	mg/l	1

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07055	Lead	SW-846 6010B	1	04/07/2006 13:17	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	04/05/2006 12:05	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	04/07/2006 02:50	Helen L Schaeffer	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. TL 4739182

BH-14-06-032306-0.5-1 Grab Soil Sample
TCLP NON-VOLATILE EXTRACTION
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 07:50 by MBS

Account Number: 10132

Submitted: 03/29/2006 15:30
Reported: 04/10/2006 at 12:13
Discard: 05/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
07055	Lead	7439-92-1	1.12	0.0200	0.0084	mg/l	1

The metal analyses were performed on a non-volatile leachate prepared according to the procedure specified in SW-846, Chapter 7.4 (Revision 3, December, 1994). A sample is considered to have failed the Toxicity Characteristic (TC) test and is considered a hazardous waste if any of the metal concentrations (mg/l) in the leachate exceed the following maxima (100 times the Primary Drinking Water Standards):

Arsenic	5.0	Cadmium	1.0	Lead	5.0	Selenium	1.0
Barium	100.0	Chromium	5.0	Mercury	0.2	Silver	5.0

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07055	Lead	SW-846 6010B	1	04/07/2006 13:22	Amanda S Bitner	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	04/05/2006 12:05	Debora L Barsis	n.a.
05705	WW/TL SW 846 ICP Digest (tot)	SW-846 3010A	1	04/07/2006 02:50	Helen L Schaeffer	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 983497
Reported: 04/10/06 at 12:13 PM

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: 060975705004	Sample number(s): 4739180-4739182								
Lead	< 0.0200	0.0200	0.0084	mg/l	109		90-113		

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: 060975705004	Sample number(s): 4739180-4739182 UNSPK: 4739180 BKG: 4739180								
Lead	109	112	75-125	1	20	0.0901	0.0894	1 (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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 10132 Group# ~~983014~~ 983497 Sample # ~~4736397-97~~ 4739180-82

COC # 0114610

Please print. Instructions on reverse side correspond with circled numbers.

temp 3.6-3.5 °C

(1) Client: Sun-Aquaterra / Langan Acct. #:

Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:

Project Manager: B. Spancake / J. Hanna (Langan) P.O.#:

Sampler: M. Brad Spancake Quote #:

Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

(2) (3) (4) (5) (6)

								Total Lead (6010B)								Remarks
BH-03-06-032206-1.5-2	3/22/06	0930	X		X		1	X								TP total lead 7~~450~~ 450 mg/kg
BH-02-06-032206-1.5-2	3/22/06	1005	X		X		1	X								please analyze TCLP via
~~BH-13-06-032206-1-1.5~~	~~3/22/06~~	1220	X		X		1	X			RJS 3/30/06					EPA method 1311
BH-14-06-032306-0.5-1	3/23/06	0750	X		X		1	X								

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad Spancake	3/23/06	1230	Aquaterra Fridge	3/23/06	1230
[signature]	3/24/06	1132	P. Lefever	3/24/06	1132
P. Lefever	3/24/06	1550			
			[signature]	3/24/06	1550

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Lancaster Laboratories

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 983432. Samples arrived at the laboratory on Wednesday, March 29, 2006. The PO# for this group is PHILADELPHIA REFINERY.

Client Description	Lancaster Labs Number
BH-26-06-032406-0.5-1 Grab Soil Sample	4738884

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Julie A. Slaughenhoupt
Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4738884

BH-26-06-032406-0.5-1 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/24/2006 09:45 by MBS

Account Number: 10132

Submitted: 03/29/2006 10:55
Reported: 04/06/2006 at 23:14
Discard: 05/07/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B26-6

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	32.6	2.15	0.840	mg/kg	1
00111	Moisture	n.a.	9.0	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	300.	180.	37.	ug/kg	1
03761	Naphthalene	91-20-3	< 180.	180.	37.	ug/kg	1
03768	Fluorene	86-73-7	< 180.	180.	37.	ug/kg	1
03775	Phenanthrene	85-01-8	210.	180.	37.	ug/kg	1
03776	Anthracene	120-12-7	< 180.	180.	37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	< 180.	180.	37.	ug/kg	1
03782	Chrysene	218-01-9	< 180.	180.	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	< 180.	180.	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	< 180.	180.	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	< 180.	180.	37.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 180.	180.	18.	ug/kg	32.94
05460	Benzene	71-43-2	180,000.	18,000.	1,800.	ug/kg	3293.81
05461	1,2-Dichloroethane	107-06-2	< 180.	180.	36.	ug/kg	32.94
05466	Toluene	108-88-3	260,000.	18,000.	3,600.	ug/kg	3293.81
05471	1,2-Dibromoethane	106-93-4	< 180.	180.	36.	ug/kg	32.94
05474	Ethylbenzene	100-41-4	2,700.	180.	36.	ug/kg	32.94
05479	Isopropylbenzene	98-82-8	800,000.	18,000.	3,600.	ug/kg	3293.81
06301	Xylene (Total)	1330-20-7	9,300.	180.	36.	ug/kg	32.94

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4738884

BH-26-06-032406-0.5-1 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/24/2006 09:45 by MBS

Account Number: 10132

Submitted: 03/29/2006 10:55
Reported: 04/06/2006 at 23:14
Discard: 05/07/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B26-6

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/31/2006 08:33	Joanne M Gates	1
00111	Moisture	EPA 160.3 modified	1	04/03/2006 18:11	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/02/2006 16:00	Mark A Clark	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/31/2006 02:33	Lauren C Marzario	32.94
02308	UST-Soils by 8260B	SW-846 8260B	1	03/31/2006 08:17	Lauren C Marzario	3293.81
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/29/2006 18:55	Justin M Bowers	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/29/2006 18:56	Justin M Bowers	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/30/2006 20:25	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/29/2006 18:55	Justin M Bowers	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/31/2006 10:30	Amanda W Herr	1

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

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 983432
Reported: 04/06/06 at 11:14 PM

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: 060895708005	Sample number(s): 4738884								
Lead	< 2.00	2.00	0.780	mg/kg	97		84-112		
Batch number: 06089SLH026	Sample number(s): 4738884								
Pyrene	< 170.	170.	33.	ug/kg	103		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	82		70-103		
Fluorene	< 170.	170.	33.	ug/kg	96		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	92		70-107		
Anthracene	< 170.	170.	33.	ug/kg	89		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	98		73-111		
Chrysene	< 170.	170.	33.	ug/kg	99		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	106		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	105		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	109		66-120		
Batch number: 06093820005B	Sample number(s): 4738884								
Moisture					100		99-101		
Batch number: Q060871AB	Sample number(s): 4738884								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	100	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	100	97	77-119	4	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	108	104	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	103	101	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	104	102	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	106	104	82-115	2	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	106	104	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	105	103	82-117	3	30

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: 060895708005	Sample number(s): 4738884 UNSPK: P739811 BKG: P739811								
Lead	102	89	75-125	7	20	11.6	13.3	14	20
Batch number: 06089SLH026	Sample number(s): 4738884 UNSPK: 4738884								
Pyrene	94	97	38-144	2	30				
Naphthalene	87	88	39-129	2	30				
Fluorene	91	92	47-126	1	30				
Phenanthrene	96	97	44-138	0	30				
Anthracene	95	94	38-142	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 background result was more than four times the spike added.

Quality Control Summary

Client Name: Langan Group Number: 983432
Reported: 04/06/06 at 11:14 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

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Benzo(a)anthracene	97	98	48-132	1	30				
Chrysene	100	100	46-133	0	30				
Benzo(b)fluoranthene	98	102	40-140	4	30				
Benzo(a)pyrene	102	103	38-142	2	30				
Benzo(g,h,i)perylene	93	95	25-154	2	30				
Batch number: 06093820005B	Sample number(s): 4738884					BKG: P738536			
Moisture						81.6	81.7	0	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: PAHs in Soil by GC/MS
Batch number: 06089SLH026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4738884	110	95	107
Blank	94	92	98
LCS	96	92	102
MS	107	93	96
MSD	110	94	98
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060871AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4738884	77	77	76	94
Blank	107	106	104	102
LCS	103	100	105	108
LCSD	101	98	104	105
Limits:	71-114	70-109	70-123	70-111

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 10132 Group# 983432 Sample # 4738884

COC # 0116036

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Sun-Aquaterra/Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:
Project Manager: P.Spancake/J.Hanna(Langan) P.O.#:
Sampler: M. Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 26565

(6)

(2) Sample Identification	Collection Date	Collection Time	(3) Matrix		(4) # of containers	(5) Analysis: 8260B BTEX, MTBE, Cumene, EDC, EDB; 8270C Pyrene, Chrysene, Naphthalene, Fluorene, Phenanthrene, Anthracene; Benzo(a) anthracene; Benzo(b) Fluoranthene; Benzo(a) pyrene; Benzo(g,h,i) perylene; Total Lead (6010B); % Moist	Remarks
BH-26-06-032406-0.5-1	3/24/06	0945	X	X	4		MeOH vial 907

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? (Yes) No
Site-specific QC required? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes (No)

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
Lot#C Storage	3/20/06	8:00	Marvin McFadden	3/23/06	8:00
Marvin McFadden	3/23/06	10:05	Aquaterra	3/23/06	10:05
M. Brad	3/24/06	1430	Aquaterra Fridge	3/24/06	1430
M. Brad	3/27/06	950	Marvin McFadden	3/28/06	9:50
Marvin McFadden	3/28/06	16:30	Pass Zoe	3/29/06	10:55

#13 BE 10:05 3/29/06

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102.02

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 983014. Samples arrived at the laboratory on Friday, March 24, 2006. The PO# for this group is PHILADELPHIA REFINERY.

Client Description	Lancaster Labs Number
BH-27-06-032306-1-1.5 Grab Soil Sample	4736392
BH-28-06-032306-1-1.5 Grab Soil Sample	4736393
BH-03-06-032206-1.5-2 Grab Soil Sample	4736394
BH-02-06-032206-1.5-2 Grab Soil Sample	4736395
BH-13-06-032206-1-1.5 Grab Soil Sample	4736396
BH-14-06-032306-0.5-1 Grab Soil Sample	4736397

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Rachel R. Cochis
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736392

BH-27-06-032306-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 09:15 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2706

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	167.	2.26	0.882	mg/kg	1
00111	Moisture	n.a.	12.4	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,000.	1,900.	380.	ug/kg	10
03761	Naphthalene	91-20-3	12,000.	1,900.	380.	ug/kg	10
03768	Fluorene	86-73-7	16,000.	1,900.	380.	ug/kg	10
03775	Phenanthrene	85-01-8	36,000.	1,900.	380.	ug/kg	10
03776	Anthracene	120-12-7	3,300.	1,900.	380.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	< 1,900.	1,900.	380.	ug/kg	10
03782	Chrysene	218-01-9	< 1,900.	1,900.	380.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	< 1,900.	1,900.	380.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	< 1,900.	1,900.	380.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	< 1,900.	1,900.	380.	ug/kg	10
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 180.	180.	18.	ug/kg	31.49
05460	Benzene	71-43-2	2,200.	180.	18.	ug/kg	31.49
05461	1,2-Dichloroethane	107-06-2	< 180.	180.	36.	ug/kg	31.49
05466	Toluene	108-88-3	< 180.	180.	36.	ug/kg	31.49
05471	1,2-Dibromoethane	106-93-4	< 180.	180.	36.	ug/kg	31.49
05474	Ethylbenzene	100-41-4	1,600.	180.	36.	ug/kg	31.49
05479	Isopropylbenzene	98-82-8	9,100.	180.	36.	ug/kg	31.49
06301	Xylene (Total)	1330-20-7	770.	180.	36.	ug/kg	31.49

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4736392

BH-27-06-032306-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 09:15 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2706

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 02:52	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/03/2006 21:01	William T Parker	10
02308	UST-Soils by 8260B	SW-846 8260B	1	03/28/2006 17:33	Susan McMahon-Luu	31.49
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/27/2006 15:08	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/27/2006 15:10	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/27/2006 15:13	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/31/2006 10:30	Amanda W Herr	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736393

BH-28-06-032306-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 10:30 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2806

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	200.	2.23	0.868	mg/kg	1
00111	Moisture	n.a.	12.8	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	8,900.	960.	190.	ug/kg	5
03761	Naphthalene	91-20-3	1,000.	190.	38.	ug/kg	1
03768	Fluorene	86-73-7	12,000.	960.	190.	ug/kg	5
03775	Phenanthrene	85-01-8	16,000.	960.	190.	ug/kg	5
03776	Anthracene	120-12-7	2,500.	190.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	4,000.	190.	38.	ug/kg	1
03782	Chrysene	218-01-9	4,300.	190.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	6,000.	960.	190.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	4,200.	960.	190.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	1,900.	190.	38.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 380.	380.	38.	ug/kg	66.49
05460	Benzene	71-43-2	1,300.	380.	38.	ug/kg	66.49
05461	1,2-Dichloroethane	107-06-2	< 380.	380.	76.	ug/kg	66.49
05466	Toluene	108-88-3	590.	380.	76.	ug/kg	66.49
05471	1,2-Dibromoethane	106-93-4	< 380.	380.	76.	ug/kg	66.49
05474	Ethylbenzene	100-41-4	670.	380.	76.	ug/kg	66.49
05479	Isopropylbenzene	98-82-8	6,400.	380.	76.	ug/kg	66.49
06301	Xylene (Total)	1330-20-7	580.	380.	76.	ug/kg	66.49
	Surrogate recoveries were outside of QC limits for the GC/MS volatile fraction. There was insufficient sample volume to repeat the analysis.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4736393

BH-28-06-032306-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 10:30 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2806

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 02:55	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/02/2006 19:30	Mark A Clark	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/03/2006 21:54	William T Parker	5
02308	UST-Soils by 8260B	SW-846 8260B	1	03/28/2006 17:56	Susan McMahon-Luu	66.49
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/27/2006 15:14	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/27/2006 15:16	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/27/2006 15:17	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/31/2006 10:30	Amanda W Herr	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736394

BH-03-06-032206-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/22/2006 09:30 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B0306

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,650.	2.92	1.14	mg/kg	1
00111	Moisture	n.a.	33.5	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 02:59	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736395

BH-02-06-032206-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/22/2006 10:05 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B0206

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,260.	3.40	1.33	mg/kg	1
00111	Moisture	n.a.	43.5	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 03:03	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736396

BH-13-06-032206-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/22/2006 12:20 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B1306

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	283.	3.15	1.23	mg/kg	1
00111	Moisture	n.a.	38.3	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 03:06	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4736397

BH-14-06-032306-0.5-1 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/23/2006 07:50 by MBS

Account Number: 10132

Submitted: 03/24/2006 15:50
Reported: 05/11/2006 at 08:36
Discard: 06/11/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B1406

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,040.	2.87	1.12	mg/kg	1
00111	Moisture	n.a.	33.1	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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/29/2006 03:10	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/29/2006 09:29	William C Schwebel	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/28/2006 08:40	Megersa Deyessa	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 983014
Reported: 05/11/06 at 08:36 AM

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: 060875708001	Sample number(s): 4736392-4736397								
Lead	< 2.00	2.00	0.780	mg/kg	98		84-112		
Batch number: 06087820005A	Sample number(s): 4736392-4736397								
Moisture					100		99-101		
Batch number: 06089SLH026	Sample number(s): 4736392-4736393								
Pyrene	< 170.	170.	33.	ug/kg	103		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	82		70-103		
Fluorene	< 170.	170.	33.	ug/kg	96		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	92		70-107		
Anthracene	< 170.	170.	33.	ug/kg	89		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	98		73-111		
Chrysene	< 170.	170.	33.	ug/kg	99		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	106		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	105		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	109		66-120		
Batch number: Q060871AA	Sample number(s): 4736392-4736393								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	100	99	75-125	1	30
Benzene	< 250.	250.	25.	ug/kg	100	97	77-119	4	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	108	104	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	103	101	81-116	2	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	104	102	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	106	104	82-115	2	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	106	104	79-117	3	30
Xylene (Total)	< 250.	250.	50.	ug/kg	105	103	82-117	3	30

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: 060875708001	Sample number(s): 4736392-4736397 UNSPK: P736439 BKG: P736439								
Lead	100	103	75-125	3	20	2.48	2.65	7 (1)	20
Batch number: 06087820005A	Sample number(s): 4736392-4736397 BKG: P736442								
Moisture						19.8	19.8	0	15
Batch number: 06089SLH026	Sample number(s): 4736392-4736393 UNSPK: P738884								
Pyrene	94	97	38-144	2	30				
Naphthalene	87	88	39-129	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 background result was more than four times the spike added.

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 983014
Reported: 05/11/06 at 08:36 AM

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
Fluorene	91	92	47-126	1	30				
Phenanthrene	96	97	44-138	0	30				
Anthracene	95	94	38-142	1	30				
Benzo(a)anthracene	97	98	48-132	1	30				
Chrysene	100	100	46-133	0	30				
Benzo(b)fluoranthene	98	102	40-140	4	30				
Benzo(a)pyrene	102	103	38-142	2	30				
Benzo(g,h,i)perylene	93	95	25-154	2	30				

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: PAHs in Soil by GC/MS
Batch number: 06089SLH026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4736392	255*	91	85
4736393	98	93	97
Blank	94	92	98
LCS	96	92	102
MS	107	93	96
MSD	110	94	98
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060871AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4736392	78	75	87	73
4736393	161*	159*	159*	180*
Blank	106	104	104	105
LCS	103	100	105	108
LCSD	101	98	104	105
Limits:	71-114	70-109	70-123	70-111

*- 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 background result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 10132 Group# 983014 Sample # 473692-97

COC # 0114611

Temp 3.6-3.8°C

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun - Aquaterra / Langan Acct. #:
Project Name/#: Sun - Philadelphia Refinery AOI-6 PWSID #:
Project Manager: B. Spancake / J. Hanna (Langan) P.O.#:
Sampler: M. Brad Spancake Quote #:
Name of state where samples were collected: PA

(2) Sample Identification | Date Collected | Time Collected | (3) Matrix | (4) # of containers | (5) Preservation Used | Analysis Requested | For Lab Use Only FSC: SCR #: | (6) Remarks

Sample Identification	Date Collected	Time Collected	Matrix	# of containers	Preservation Used	Analysis Requested	Remarks
BH-27-06-032306-1-1.5	3/23/06	0915	X	4	X	8260B BTEX, MTBE, Cumene, EDC, EDB; 8270C Pyrene, Naphthalene, Phenanthrene, Anthracene, Chrysene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene; Total Lead (6010B); % Moist.	MeOH vial 66134
BH-28-06-032306-1-1.5	3/23/06	1030	X	4	X		MeOH vial 66644

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)
SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad	3/23/06	1230	Aquaterra Fridge	3/23/06	1230
Paige Cuida	3/24/06	1132	P. Lefevre	3/24/06	1132
P. Lefevre	3/24/06	1550			

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Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102.02

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 10132 Group# 983014 Sample # 4736392-97

COC # 0114610

Please print. Instructions on reverse side correspond with circled numbers.

temp 3.6-3.9 °C

(1) Client: Sun-Aquaterra / Langan Acct. #:

Project Name/#: Sun-Philadelphia Refinery AOI-6 PWSID #:

Project Manager: BSpancake / J. Henna (Langan) P.O.#:

Sampler: M. Brad Spancake Quote #:

Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

(6)

(2) Sample Identification	Collection Date	Collection Time	(3) Matrix: Drinking Water	Groundwater	Wastewater	Soil	Other	# of containers	(4) Preservation: Unpreserved	HCl	HNO3	H2SO4	NaOH	Other	(5) Analyses Requested: Total Lead (6010 B)								Remarks
BH-03-06-032206-1.5-2	3/22/06	0930	X		X			1							X								If total lead 450 mg/kg please analyze TCLP via EPA method 1311
BH-02-06-032206-1.5-2	3/22/06	1005	X		X			1							X								
BH-13-06-032206-1-1.5	3/22/06	1220	X		X			1							X								
BH-14-06-032306-0.5-1	3/23/06	0750	X		X			1							X								

(7) **Turnaround Time Requested** (TAT) (please circle) (Normal) Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Date results are needed:

Rush results requested by (please circle): Phone Fax E-mail

Phone #: Fax #:

E-mail address:

(8) **Data Package Options** (please circle if required)

QC Summary | Type I (Tier I) | Type II (Tier II) | Type III (NJ Red. Del.) | Type IV (CLP) | Type VI (Raw Data) | GLP | Other

SDG Complete? (Yes) No

Site-specific QC required? Yes (No)

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes (No)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad Spancake	3/23/06	1230	Aquaterra Fridge	3/23/06	1230
Paige Childs	3/24/06	1132	P. Lefever	3/24/06	1132
P. Lefever	3/24/06	1550			

(9)

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300

Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102.02

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 982662. Samples arrived at the laboratory on Wednesday, March 22, 2006. The PO# for this group is PHILADELPHIA REFINERY.

Client Description	Lancaster Labs Number
Trip Blank Water Sample	4734411

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Robin C. Runkle
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. WW 4734411

Trip Blank Water Sample
SUN: Philadelphia Refinery AOF-6

Collected: n.a.

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 03/31/2006 at 10:21
Discard: 05/01/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

TBAF6

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation*	As Received Method Detection Limit	Units	Dilution Factor
02302	UST-Waters by 8260B						
02010	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/l	1
05401	Benzene	71-43-2	< 5.	5.	0.5	ug/l	1
05402	1,2-Dichloroethane	107-06-2	< 5.	5.	1.	ug/l	1
05407	Toluene	108-88-3	< 5.	5.	0.7	ug/l	1
05412	1,2-Dibromoethane	106-93-4	< 5.	5.	1.	ug/l	1
05415	Ethylbenzene	100-41-4	< 5.	5.	0.8	ug/l	1
05420	Isopropylbenzene	98-82-8	< 5.	5.	1.	ug/l	1
06310	Xylene (Total)	1330-20-7	< 5.	5.	0.8	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02302	UST-Waters by 8260B	SW-846 8260B	1	03/27/2006 11:03	Emiley A King	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	03/27/2006 11:03	Emiley A King	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 982662
Reported: 03/31/06 at 10:21 AM

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: T060861AA	Sample number(s): 4734411								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/l	99	98	73-119	1	30
Benzene	< 5.	5.	0.5	ug/l	101	100	85-117	0	30
1,2-Dichloroethane	< 5.	5.	1.	ug/l	110	109	77-132	2	30
Toluene	< 5.	5.	0.7	ug/l	95	96	85-115	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/l	100	98	81-114	1	30
Ethylbenzene	< 5.	5.	0.8	ug/l	97	95	82-119	2	30
Isopropylbenzene	< 5.	5.	1.	ug/l	104	103	80-120	0	30
Xylene (Total)	< 5.	5.	0.8	ug/l	97	97	83-113	0	30

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: T060861AA	Sample number(s): 4734411 UNSPK: P734856								
Methyl Tertiary Butyl Ether	102		69-127						
Benzene	109		83-128						
1,2-Dichloroethane	115		70-143						
Toluene	101		83-127						
1,2-Dibromoethane	101		78-120						
Ethylbenzene	103		82-129						
Isopropylbenzene	112		81-130						
Xylene (Total)	104		82-130						

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-Waters by 8260B
Batch number: T060861AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734411	95	94	94	96
Blank	98	94	95	97
LCS	97	95	95	100
LCSD	96	96	95	98
MS	97	97	96	99

*- 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 background result was more than four times the spike added.

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 982662
Reported: 03/31/06 at 10:21 AM

Surrogate Quality Control

Limits:	80-116	77-113	80-113	78-113

*- 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 background result was more than four times the spike added.

Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
Where quality is a science.

For Lancaster Laboratories use only

Acct. # 10132 Group# 982659 Sample # 4734387-95

982662 / 4734411

COC # 0104804

Please print. Instructions on reverse side correspond with circled numbers.

(1)

Client: Sun - Aguaterra / Langan Acct. #:

Project Name/#: Sun - Philadelphia Refinery AOF-5 PWSID #:

Project Manager: B. Spancake / J. Hanna (Langan) P.O.#:

Sampler: M. Brad Spancake Quote #:

Name of state where samples were collected: PA

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	(4) Matrix: Soil	Water	Other	Total # of Containers	(5) Analyses Requested: 8260B BTEX, MTBE, Cumene + EDC, EDB; 8270C Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, 1-Methylnaphthalene, 2-Methylnaphthalene, Naphthalene, Phenanthrene, Pyrene, Total Lead	Remarks	(6) Temperature of samples upon receipt (if requested)
BH-B156-032006-1-1.5	3/20/06	0845	X					4		MeOH vial 6643	
BH-B155-032006-1.5-2	3/20/06	0920	X					4		MeOH vial 6638	
BH-20-06-032006-1-1.5	3/20/06	1320	X					4		MeOH vial 6642	
BH-21-06-032006-1.5-2	3/20/06	1400	X					4		MeOH vial 6637	
BH-23-06-032006-1-1.5	3/21/06	0900	X					4		MeOH vial 6636	
BH-24-06-032106-1-1.5	3/21/06	1025	X					4		MeOH vial 6641	
BH-25-06-032106-1-1.5	3/21/06	1100	X					4		MeOH vial 6640	
BH-22-06-032106-1.5-2	3/21/06	1215	X					4		6635	
BH-29-06-032106-1.5-2	3/21/06	1310	X					4		6639	

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Date results are needed:

Rush results requested by (please circle): Phone Fax E-mail

Phone #: Fax #:

E-mail address:

(8) **Data Package Options** (please circle if required)

QC Summary | Type VI (Raw Data) | SDG Complete? Yes No

Type I (Tier I) | GLP

Type II (Tier II) | Other

Type III (NJ Red. Del.)

Type IV (CLP)

Site-specific QC required? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad	3/24/06	1700	AT BRIDGE	3/24/06	1700
AT BRIDGE	3/22/06	1020	[signature]	3/22/06	1020
[signature]	3/22/06	1020	Marvin McCollister	3/22/06	10:20
Marvin McCollister	3/22/06	1615			
	Date	Time	[signature]	3/22/06	1615

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Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102 Rev. 10/27/02

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

215-491-6500

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 982659. Samples arrived at the laboratory on Wednesday, March 22, 2006. The PO# for this group is PHILADELPHIA REFINERY.

Client Description	Lancaster Labs Number
BH-B156-032006-1-1.5 Grab Soil Sample	4734387
BH-B155-032006-1.5-2 Grab Soil Sample	4734388
BH-20-06-032006-1-1.5 Grab Soil Sample	4734389
BH-21-06-032006-1.5-2 Grab Soil Sample	4734390
BH-23-06-032106-1-1.5 Grab Soil Sample	4734391
BH-24-06-032106-1-1.5 Grab Soil Sample	4734392
BH-25-06-032106-1-1.5 Grab Soil Sample	4734393
BH-22-06-032106-1.5-2 Grab Soil Sample	4734394
BH-29-06-032106-1.5-2 Grab Soil Sample	4734395

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

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Analysis Report

Questions? Contact your Client Services Representative
Rebecca J Shettel at (717) 656-2300

Respectfully Submitted,

Robin C. Runkle
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4734387

BH-B156-032006-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 08:45 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B156-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	1,070.	2.56	1.00	mg/kg	1
00111	Moisture	n.a.	22.0	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,500.	210.	43.	ug/kg	1
03761	Naphthalene	91-20-3	370.	210.	43.	ug/kg	1
03768	Fluorene	86-73-7	1,900.	210.	43.	ug/kg	1
03775	Phenanthrene	85-01-8	4,300.	210.	43.	ug/kg	1
03776	Anthracene	120-12-7	860.	210.	43.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	830.	210.	43.	ug/kg	1
03782	Chrysene	218-01-9	920.	210.	43.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,100.	210.	43.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	820.	210.	43.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	420.	210.	43.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	0.5	ug/kg	0.72
05460	Benzene	71-43-2	9.	5.	0.5	ug/kg	0.72
05461	1,2-Dichloroethane	107-06-2	< 5.	5.	0.9	ug/kg	0.72
05466	Toluene	108-88-3	6.	5.	0.9	ug/kg	0.72
05471	1,2-Dibromoethane	106-93-4	< 5.	5.	0.9	ug/kg	0.72
05474	Ethylbenzene	100-41-4	< 5.	5.	0.9	ug/kg	0.72
05479	Isopropylbenzene	98-82-8	7.	5.	0.9	ug/kg	0.72
06301	Xylene (Total)	1330-20-7	7.	5.	0.9	ug/kg	0.72

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734387

BH-B156-032006-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 08:45 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B156-

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 07:08	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/31/2006 01:49	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/27/2006 15:51	Kenneth L Boley Jr	0.72
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:01	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:03	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:04	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734388

BH-B155-032006-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 09:20 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B155-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	618.	2.70	1.05	mg/kg	1
00111	Moisture	n.a.	27.3	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,300.	230.	46.	ug/kg	1
03761	Naphthalene	91-20-3	700.	230.	46.	ug/kg	1
03768	Fluorene	86-73-7	1,100.	230.	46.	ug/kg	1
03775	Phenanthrene	85-01-8	3,000.	230.	46.	ug/kg	1
03776	Anthracene	120-12-7	750.	230.	46.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	840.	230.	46.	ug/kg	1
03782	Chrysene	218-01-9	820.	230.	46.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,100.	230.	46.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	780.	230.	46.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	310.	230.	46.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 220.	220.	22.	ug/kg	31.81
05460	Benzene	71-43-2	< 220.	220.	22.	ug/kg	31.81
05461	1,2-Dichloroethane	107-06-2	< 220.	220.	44.	ug/kg	31.81
05466	Toluene	108-88-3	< 220.	220.	44.	ug/kg	31.81
05471	1,2-Dibromoethane	106-93-4	< 220.	220.	44.	ug/kg	31.81
05474	Ethylbenzene	100-41-4	< 220.	220.	44.	ug/kg	31.81
05479	Isopropylbenzene	98-82-8	< 220.	220.	44.	ug/kg	31.81
06301	Xylene (Total)	1330-20-7	< 220.	220.	44.	ug/kg	31.81
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734388

BH-B155-032006-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 09:20 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B155-

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:07	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	03/31/2006 05:21	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 13:10	Seth J Good	31.81
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:10	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:12	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:13	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734389

BH-20-06-032006-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 13:20 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2006

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	145.	2.44	0.951	mg/kg	1
00111	Moisture	n.a.	20.4	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	6,900.	2,100.	420.	ug/kg	10
03761	Naphthalene	91-20-3	< 2,100.	2,100.	420.	ug/kg	10
03768	Fluorene	86-73-7	71,000.	4,200.	840.	ug/kg	20
03775	Phenanthrene	85-01-8	37,000.	2,100.	420.	ug/kg	10
03776	Anthracene	120-12-7	2,500.	2,100.	420.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	3,800.	2,100.	420.	ug/kg	10
03782	Chrysene	218-01-9	4,200.	2,100.	420.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	6,300.	2,100.	420.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	4,900.	2,100.	420.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	2,900.	2,100.	420.	ug/kg	10
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 200.	200.	20.	ug/kg	31.37
05460	Benzene	71-43-2	290.	200.	20.	ug/kg	31.37
05461	1,2-Dichloroethane	107-06-2	< 200.	200.	39.	ug/kg	31.37
05466	Toluene	108-88-3	410.	200.	39.	ug/kg	31.37
05471	1,2-Dibromoethane	106-93-4	< 200.	200.	39.	ug/kg	31.37
05474	Ethylbenzene	100-41-4	460.	200.	39.	ug/kg	31.37
05479	Isopropylbenzene	98-82-8	9,700.	2,000.	390.	ug/kg	313.68
06301	Xylene (Total)	1330-20-7	1,000.	200.	39.	ug/kg	31.37

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734389

BH-20-06-032006-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 13:20 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2006

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:11	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 01:48	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 11:33	Mark A Clark	20
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 15:05	Seth J Good	31.37
02308	UST-Soils by 8260B	SW-846 8260B	1	03/27/2006 15:01	Susan McMahon-Luu	313.68
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:15	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:17	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:18	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4734390

BH-21-06-032006-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 14:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2106

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	286.	2.15	0.839	mg/kg	1
00111	Moisture	n.a.	9.7	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	< 1,800.	1,800.	370.	ug/kg	10
03761	Naphthalene	91-20-3	< 1,800.	1,800.	370.	ug/kg	10
03768	Fluorene	86-73-7	< 1,800.	1,800.	370.	ug/kg	10
03775	Phenanthrene	85-01-8	< 1,800.	1,800.	370.	ug/kg	10
03776	Anthracene	120-12-7	< 1,800.	1,800.	370.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	< 1,800.	1,800.	370.	ug/kg	10
03782	Chrysene	218-01-9	< 1,800.	1,800.	370.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	< 1,800.	1,800.	370.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	< 1,800.	1,800.	370.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	< 1,800.	1,800.	370.	ug/kg	10
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the GC/MS semivolatile compounds were raised.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 190.	190.	19.	ug/kg	34.77
05460	Benzene	71-43-2	340.	190.	19.	ug/kg	34.77
05461	1,2-Dichloroethane	107-06-2	< 190.	190.	39.	ug/kg	34.77
05466	Toluene	108-88-3	< 190.	190.	39.	ug/kg	34.77
05471	1,2-Dibromoethane	106-93-4	< 190.	190.	39.	ug/kg	34.77
05474	Ethylbenzene	100-41-4	810.	190.	39.	ug/kg	34.77
05479	Isopropylbenzene	98-82-8	32,000.	1,900.	390.	ug/kg	347.71
06301	Xylene (Total)	1330-20-7	830.	190.	39.	ug/kg	34.77

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734390

BH-21-06-032006-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/20/2006 14:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2106

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:14	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 02:41	Linda M Hartenstine	10
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 13:33	Seth J Good	34.77
02308	UST-Soils by 8260B	SW-846 8260B	1	03/27/2006 14:38	Susan McMahon-Luu	347.71
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:20	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:23	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:26	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734391

BH-23-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 09:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2306

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	417.	2.48	0.968	mg/kg	1
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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,600.	630.	130.	ug/kg	1
03761	Naphthalene	91-20-3	980.	630.	130.	ug/kg	1
03768	Fluorene	86-73-7	3,500.	630.	130.	ug/kg	1
03775	Phenanthrene	85-01-8	7,400.	630.	130.	ug/kg	1
03776	Anthracene	120-12-7	1,300.	630.	130.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	790.	630.	130.	ug/kg	1
03782	Chrysene	218-01-9	1,300.	630.	130.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,200.	630.	130.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,100.	630.	130.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	890.	630.	130.	ug/kg	1
	Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.						
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 210.	210.	21.	ug/kg	33.03
05460	Benzene	71-43-2	< 210.	210.	21.	ug/kg	33.03
05461	1,2-Dichloroethane	107-06-2	< 210.	210.	41.	ug/kg	33.03
05466	Toluene	108-88-3	< 210.	210.	41.	ug/kg	33.03
05471	1,2-Dibromoethane	106-93-4	< 210.	210.	41.	ug/kg	33.03
05474	Ethylbenzene	100-41-4	< 210.	210.	41.	ug/kg	33.03
05479	Isopropylbenzene	98-82-8	810.	210.	41.	ug/kg	33.03
06301	Xylene (Total)	1330-20-7	370.	210.	41.	ug/kg	33.03
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories Sample No. SW 4734391

BH-23-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 09:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2306

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:18	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/05/2006 00:57	William T Parker	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 14:19	Seth J Good	33.03
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:27	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:29	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:30	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	2	04/03/2006 18:30	Sally L Appleyard	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4734392

BH-24-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 10:25 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2406

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	233.	2.31	0.902	mg/kg	1
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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	5,800.	1,900.	390.	ug/kg	10
03761	Naphthalene	91-20-3	< 1,900.	1,900.	390.	ug/kg	10
03768	Fluorene	86-73-7	63,000.	3,900.	780.	ug/kg	20
03775	Phenanthrene	85-01-8	46,000.	1,900.	390.	ug/kg	10
03776	Anthracene	120-12-7	3,900.	1,900.	390.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	< 1,900.	1,900.	390.	ug/kg	10
03782	Chrysene	218-01-9	2,000.	1,900.	390.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	< 1,900.	1,900.	390.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	< 1,900.	1,900.	390.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	< 1,900.	1,900.	390.	ug/kg	10
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 170.	170.	17.	ug/kg	29.69
05460	Benzene	71-43-2	< 170.	170.	17.	ug/kg	29.69
05461	1,2-Dichloroethane	107-06-2	< 170.	170.	35.	ug/kg	29.69
05466	Toluene	108-88-3	200.	170.	35.	ug/kg	29.69
05471	1,2-Dibromoethane	106-93-4	< 170.	170.	35.	ug/kg	29.69
05474	Ethylbenzene	100-41-4	< 170.	170.	35.	ug/kg	29.69
05479	Isopropylbenzene	98-82-8	9,900.	170.	35.	ug/kg	29.69
06301	Xylene (Total)	1330-20-7	560.	170.	35.	ug/kg	29.69

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734392

BH-24-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 10:25 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2406

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:29	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 05:18	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 13:18	Mark A Clark	20
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 15:28	Seth J Good	29.69
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:32	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:34	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:36	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4734393

BH-25-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 11:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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B2506

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	231.	2.46	0.958	mg/kg	1
00111	Moisture	n.a.	19.4	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	11,000.	2,100.	410.	ug/kg	10
03761	Naphthalene	91-20-3	2,400.	2,100.	410.	ug/kg	10
03768	Fluorene	86-73-7	120,000.	10,000.	2,100.	ug/kg	50
03775	Phenanthrene	85-01-8	120,000.	10,000.	2,100.	ug/kg	50
03776	Anthracene	120-12-7	10,000.	2,100.	410.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	5,300.	2,100.	410.	ug/kg	10
03782	Chrysene	218-01-9	4,800.	2,100.	410.	ug/kg	10
03786	Benzo(b)fluoranthene	205-99-2	8,100.	2,100.	410.	ug/kg	10
03788	Benzo(a)pyrene	50-32-8	6,000.	2,100.	410.	ug/kg	10
03791	Benzo(g,h,i)perylene	191-24-2	3,600.	2,100.	410.	ug/kg	10
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 220.	220.	22.	ug/kg	35.11
05460	Benzene	71-43-2	2,300.	220.	22.	ug/kg	35.11
05461	1,2-Dichloroethane	107-06-2	< 220.	220.	44.	ug/kg	35.11
05466	Toluene	108-88-3	1,700.	220.	44.	ug/kg	35.11
05471	1,2-Dibromoethane	106-93-4	< 220.	220.	44.	ug/kg	35.11
05474	Ethylbenzene	100-41-4	300.	220.	44.	ug/kg	35.11
05479	Isopropylbenzene	98-82-8	2,700.	220.	44.	ug/kg	35.11
06301	Xylene (Total)	1330-20-7	1,100.	220.	44.	ug/kg	35.11
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734393

BH-25-06-032106-1-1.5 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 11:00 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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2700 Kelly Road
Warrington PA 18976

B2506

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:33	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 06:10	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 14:11	Mark A Clark	50
02308	UST-Soils by 8260B	SW-846 8260B	1	03/27/2006 21:53	Susan McMahon-Luu	35.11
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 09:38	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 09:39	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 09:40	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4734394

BH-22-06-032106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 12:15 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

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Suite 200
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Warrington PA 18976

B2206

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	165.	2.16	0.841	mg/kg	1
00111	Moisture	n.a.	10.	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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	220.	190.	37.	ug/kg	1
03761	Naphthalene	91-20-3	< 190.	190.	37.	ug/kg	1
03768	Fluorene	86-73-7	< 190.	190.	37.	ug/kg	1
03775	Phenanthrene	85-01-8	< 190.	190.	37.	ug/kg	1
03776	Anthracene	120-12-7	< 190.	190.	37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	< 190.	190.	37.	ug/kg	1
03782	Chrysene	218-01-9	< 190.	190.	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	400.	190.	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	350.	190.	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	290.	190.	37.	ug/kg	1
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 4.	4.	0.4	ug/kg	0.64
05460	Benzene	71-43-2	< 4.	4.	0.4	ug/kg	0.64
05461	1,2-Dichloroethane	107-06-2	< 4.	4.	0.7	ug/kg	0.64
05466	Toluene	108-88-3	< 4.	4.	0.7	ug/kg	0.64
05471	1,2-Dibromoethane	106-93-4	< 4.	4.	0.7	ug/kg	0.64
05474	Ethylbenzene	100-41-4	< 4.	4.	0.7	ug/kg	0.64
05479	Isopropylbenzene	98-82-8	< 4.	4.	0.7	ug/kg	0.64
06301	Xylene (Total)	1330-20-7	< 4.	4.	0.7	ug/kg	0.64

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

Laboratory Chronicle

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Analysis Report

Lancaster Laboratories Sample No. SW 4734394

BH-22-06-032106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 12:15 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2206

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:37	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 07:03	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	03/30/2006 19:06	Kenneth L Boley Jr	0.64
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 10:08	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 10:10	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 10:12	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4734395

BH-29-06-032106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 13:10 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2906

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Limit of Quantitation*	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	2,520.	2.48	0.968	mg/kg	1
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.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	110,000.	10,000.	2,100.	ug/kg	50
03761	Naphthalene	91-20-3	2,400.	2,100.	420.	ug/kg	10
03768	Fluorene	86-73-7	14,000.	2,100.	420.	ug/kg	10
03775	Phenanthrene	85-01-8	91,000.	10,000.	2,100.	ug/kg	50
03776	Anthracene	120-12-7	27,000.	2,100.	420.	ug/kg	10
03781	Benzo(a)anthracene	56-55-3	70,000.	10,000.	2,100.	ug/kg	50
03782	Chrysene	218-01-9	73,000.	10,000.	2,100.	ug/kg	50
03786	Benzo(b)fluoranthene	205-99-2	75,000.	10,000.	2,100.	ug/kg	50
03788	Benzo(a)pyrene	50-32-8	59,000.	10,000.	2,100.	ug/kg	50
03791	Benzo(g,h,i)perylene	191-24-2	29,000.	2,100.	420.	ug/kg	10
02308	UST-Soils by 8260B						
02016	Methyl Tertiary Butyl Ether	1634-04-4	< 230.	230.	23.	ug/kg	36.55
05460	Benzene	71-43-2	410.	230.	23.	ug/kg	36.55
05461	1,2-Dichloroethane	107-06-2	< 230.	230.	46.	ug/kg	36.55
05466	Toluene	108-88-3	< 230.	230.	46.	ug/kg	36.55
05471	1,2-Dibromoethane	106-93-4	< 230.	230.	46.	ug/kg	36.55
05474	Ethylbenzene	100-41-4	< 230.	230.	46.	ug/kg	36.55
05479	Isopropylbenzene	98-82-8	990.	230.	46.	ug/kg	36.55
06301	Xylene (Total)	1330-20-7	560.	230.	46.	ug/kg	36.55
	The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4734395

BH-29-06-032106-1.5-2 Grab Soil Sample
SUN: Philadelphia Refinery AOI-6

Collected:03/21/2006 13:10 by BS

Account Number: 10132

Submitted: 03/22/2006 16:15
Reported: 04/07/2006 at 12:57
Discard: 05/08/2006

Langan
Suite 200
2700 Kelly Road
Warrington PA 18976

B2906

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
06955	Lead	SW-846 6010B	1	03/24/2006 08:40	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	03/23/2006 15:24	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/01/2006 15:03	Mark A Clark	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/03/2006 20:08	William T Parker	50
02308	UST-Soils by 8260B	SW-846 8260B	1	03/24/2006 14:42	Seth J Good	36.55
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	03/23/2006 10:14	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	03/23/2006 10:16	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	03/23/2006 19:45	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	03/23/2006 10:17	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	03/26/2006 13:00	Maryan G Attalla	1

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

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: Langan Group Number: 982659
Reported: 04/07/06 at 12:57 PM

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: 060825708001	Sample number(s): 4734387-4734395								
Lead	< 2.00	2.00	0.780	mg/kg	96		84-112		
Batch number: 06082820005A	Sample number(s): 4734387-4734391								
Moisture					100		99-101		
Batch number: 06082820005B	Sample number(s): 4734392-4734395								
Moisture					100		99-101		
Batch number: 06084SLA026	Sample number(s): 4734387-4734390,4734392-4734395								
Pyrene	< 170.	170.	33.	ug/kg	84		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	86		70-103		
Fluorene	< 170.	170.	33.	ug/kg	89		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	87		70-107		
Anthracene	< 170.	170.	33.	ug/kg	84		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	88		73-111		
Chrysene	< 170.	170.	33.	ug/kg	89		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	96		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	95		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	79		66-120		
Batch number: 06093SLE026	Sample number(s): 4734391								
Pyrene	< 170.	170.	33.	ug/kg	82		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	88		70-103		
Fluorene	< 170.	170.	33.	ug/kg	90		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	78		70-107		
Anthracene	< 170.	170.	33.	ug/kg	79		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	84		73-111		
Chrysene	< 170.	170.	33.	ug/kg	83		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	84		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	85		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	85		66-120		
Batch number: Q060792AD	Sample number(s): 4734388-4734392,4734395								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	101	103	75-125	3	30
Benzene	< 250.	250.	25.	ug/kg	99	104	77-119	5	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	104	107	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	99	105	81-116	6	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	105	106	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	100	106	82-115	5	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	101	108	79-117	6	30
Xylene (Total)	< 250.	250.	50.	ug/kg	101	107	82-117	5	30
Batch number: Q060792AE	Sample number(s): 4734389-4734390,4734393								
Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	101	103	75-125	3	30
Benzene	< 250.	250.	25.	ug/kg	99	104	77-119	5	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	104	107	76-126	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 background result was more than four times the spike added.

Quality Control Summary

Client Name: Langan Group Number: 982659
Reported: 04/07/06 at 12:57 PM

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Toluene	< 250.	250.	50.	ug/kg	99	105	81-116	6	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	105	106	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	100	106	82-115	5	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	101	108	79-117	6	30
Xylene (Total)	< 250.	250.	50.	ug/kg	101	107	82-117	5	30
Batch number: X060811AB	Sample number(s): 4734387								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	98	95	75-125	3	30
Benzene	< 5.	5.	0.5	ug/kg	106	101	77-119	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	102	99	76-126	3	30
Toluene	< 5.	5.	1.	ug/kg	100	99	81-116	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	98	96	77-114	2	30
Ethylbenzene	< 5.	5.	1.	ug/kg	101	97	82-115	4	30
Isopropylbenzene	< 5.	5.	1.	ug/kg	100	93	79-117	7	30
Xylene (Total)	< 5.	5.	1.	ug/kg	101	96	82-117	4	30
Batch number: X060891AA	Sample number(s): 4734394								
Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	94	94	75-125	0	30
Benzene	< 5.	5.	0.5	ug/kg	105	104	77-119	1	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	107	105	76-126	2	30
Toluene	< 5.	5.	1.	ug/kg	104	103	81-116	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	101	101	77-114	0	30
Ethylbenzene	< 5.	5.	1.	ug/kg	105	101	82-115	4	30
Isopropylbenzene	< 5.	5.	1.	ug/kg	102	99	79-117	3	30
Xylene (Total)	< 5.	5.	1.	ug/kg	104	101	82-117	3	30

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: 060825708001	Sample number(s): 4734387-4734395 UNSPK: 4734387 BKG: 4734387								
Lead	(2)	(2)	75-125	43*	20	831.	306.	92*	20
Batch number: 06082820005A	Sample number(s): 4734387-4734391 BKG: P733412								
Moisture						24.6	24.3	1	15
Batch number: 06082820005B	Sample number(s): 4734392-4734395 BKG: P734503								
Moisture						13.2	13.4	1	15
Batch number: 06084SLA026	Sample number(s): 4734387-4734390,4734392-4734395 UNSPK: 4734387								
Pyrene	60	81	38-144	16	30				
Naphthalene	71	86	39-129	17	30				
Fluorene	67	85	47-126	14	30				
Phenanthrene	55	77	44-138	13	30				
Anthracene	77	93	38-142	15	30				
Benzo(a)anthracene	74	91	48-132	16	30				
Chrysene	81	104	46-133	20	30				
Benzo(b)fluoranthene	85	103	40-140	15	30				
Benzo(a)pyrene	80	96	38-142	15	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 background result was more than four times the spike added.

Quality Control Summary

Client Name: Langan Group Number: 982659
Reported: 04/07/06 at 12:57 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

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Benzo(g,h,i)perylene	47	55	25-154	13	30				
Batch number: 06093SLE026	Sample number(s): 4734391 UNSPK: P741564								
Pyrene	81	76	38-144	5	30				
Naphthalene	81	71	39-129	8	30				
Fluorene	99	115	47-126	11	30				
Phenanthrene	78	75	44-138	2	30				
Anthracene	81	83	38-142	2	30				
Benzo(a)anthracene	87	83	48-132	5	30				
Chrysene	90	85	46-133	6	30				
Benzo(b)fluoranthene	86	82	40-140	6	30				
Benzo(a)pyrene	85	82	38-142	4	30				
Benzo(g,h,i)perylene	89	84	25-154	6	30				
Batch number: X060811AB	Sample number(s): 4734387 UNSPK: P731195								
Methyl Tertiary Butyl Ether	97		47-130						
Benzene	116		59-120						
1,2-Dichloroethane	107		62-130						
Toluene	109		49-132						
1,2-Dibromoethane	95		62-116						
Ethylbenzene	106		50-127						
Isopropylbenzene	103		41-120						
Xylene (Total)	102		44-127						
Batch number: X060891AA	Sample number(s): 4734394 UNSPK: P736805								
Methyl Tertiary Butyl Ether	92		47-130						
Benzene	103		59-120						
1,2-Dichloroethane	102		62-130						
Toluene	98		49-132						
1,2-Dibromoethane	90		62-116						
Ethylbenzene	86		50-127						
Isopropylbenzene	72		41-120						
Xylene (Total)	82		44-127						

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: PAHs in Soil by GC/MS
Batch number: 06084SLA026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4734387	97	90	93
4734388	101	90	95
4734389	94	86	89
4734390	109	95	90
4734392	99	76	80
4734393	90	87	87

*- Outside of specification
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Quality Control Summary

Client Name: Langan Group Number: 982659
Reported: 04/07/06 at 12:57 PM

Surrogate Quality Control

4734394	96	91	96
4734395	97	85	82
Blank	88	86	91
LCS	89	85	85
MS	79	74	75
MSD	94	86	90
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06093SLE026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4734391	91	84	81
Blank	92	91	89
LCS	96	88	91
MS	106	123	89
MSD	102	126*	85
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060792AD

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734388	80	78	77	75
4734389	83	81	74	81
4734390	82	80	94	85
4734391	74	73	77	93
4734392	79	77	83	101
4734395	77	76	87	76
Blank	106	103	102	103
LCS	104	107	102	104
LCSD	104	101	103	102
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: Q060792AE

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734393	81	76	77	101
Blank	110	107	101	102
LCS	104	107	102	104
LCSD	104	101	103	102
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: X060811AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734387	84	84	89	86
Blank	88	87	86	87
LCS	88	82	89	86
LCSD	88	85	89	86
MS	85	82	89	85

*- Outside of specification
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Quality Control Summary

Client Name: Langan Group Number: 982659
Reported: 04/07/06 at 12:57 PM

Surrogate Quality Control

Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: X060891AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734394	86	83	90	93
Blank	88	84	92	84
LCS	87	83	91	88
LCSD	86	86	91	86
MS	86	85	93	88
Limits:	71-114	70-109	70-123	70-111

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.

Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
Where quality is a science.

Acct. # 10132 For Lancaster Laboratories use only Group# 982659 Sample # 4734387-95

982662/4734411

COC # 0104804

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Sun-Aquaterra/Langan Acct. #:
Project Name/#: Sun-Philadelphia Refinery AOF-B PWSID #:
Project Manager: B. Spancake / T. Hanna (Langan) P.O. #:
Sampler: M. Brad Spancake Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #:

(6)

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	(4) Matrix: Soil	Water	Other	Total # of containers	(5) Analysis Requested: 8260B BTEX, MTBE; Cumene + EDC + EDB; 8270C Anthracene, Benzo(a)anthracene, Benzo(b) fluoranthene, Benzo(g,h,i) perylene, Benzo(a) pyrene, Chrysene, Fluoranthene, Naphthalene, Phenanthrene, Pyrene; Total Lead	Remarks
BH-B156-032006-1-1.5	3/20/06	0845	X					4		MeOH vial 66643
BH-B155-032006-1.5-2	3/20/06	0920	X					4		MeOH vial 66638
BH-20-06-032006-1-1.5	3/20/06	1320	X					4		MeOH vial 66642
BH-21-06-032006-1.5-2	3/20/06	1400	X					4		MeOH vial 66637
BH-23-06-032006-1-1.5	3/21/06	0900	X					4		MeOH vial 66636
BH-24-06-032106-1-1.5	3/21/06	1025	X					4		MeOH vial 66641
BH-25-06-032106-1-1.5	3/21/06	1100	X					4		MeOH vial 66640
BH-22-06-032106-1.5-2	3/21/06	1215	X					4		66635
BH-29-06-032106-1.5-2	3/21/06	1310	X					4		66639

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

(8) **Data Package Options** (please circle if required)

QC Summary	Type VI (Raw Data)	SDG Complete? Yes No
Type I (Tier I)	GLP	Site-specific QC required? Yes No
Type II (Tier II)	Other	(If yes, indicate QC sample and submit triplicate volume.)
Type III (NJ Red. Del.)		Internal Chain of Custody required? Yes No
Type IV (CLP)		

(9)

Relinquished by:	Date	Time	Received by:	Date	Time
M. Brad	3/24/06	1700	AT FRIDGE	3/24/06	1700
AT BRIDGE	3/22/06	1020		3/22/06	1020
	3/22/06	1020	Marvin McCollister	3/22/06	10:20
Marvin McCollister	3/22/06	16:15			
				3/22/06	16:15

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102 Rev. 10/27/02

Lancaster Laboratories
Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm 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.

ppb parts per billion

Dry weight basis 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

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quatitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike amount not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	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.

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ANALYTICAL RESULTS

Prepared for:

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Suite 200
2700 Kelly Road
Warrington PA 18976
215-491-6500

Prepared by:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 982659. Samples arrived at the laboratory on Wednesday, Mar 22 2006.
The project for this group is SUN: Philadelphia Refinery AOI-6.
The PO# for this sample group is PHILADELPHIA REFINERY.

Sample No.	Collected	Client Description
4734387	3/20/2006 8:45	BH-B156-032006-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734388	3/20/2006 9:20	BH-B155-032006-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734389	3/20/2006 13:20	BH-20-06-032006-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734390	3/20/2006 14:00	BH-21-06-032006-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734391	3/21/2006 9:00	BH-23-06-032106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734392	3/21/2006 10:25	BH-24-06-032106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734393	3/21/2006 11:00	BH-25-06-032106-1-1.5 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734394	3/21/2006 12:15	BH-22-06-032106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6
4734395	3/21/2006 13:10	BH-29-06-032106-1.5-2 Grab Soil Sample SUN: Philadelphia Refinery AOI-6

ELECTRONIC COPY TO	SUN: Aquaterra Tech.	Attn: Brad Spancake
ELECTRONIC COPY TO	Langan	Attn: Jason Hanna
ELECTRONIC COPY TO	Langan	Attn: Joseph Catricks

ANALYTICAL RESULTS

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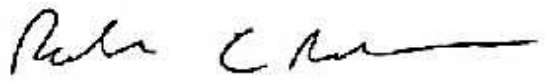
Questions? Contact your Client Services Representative
Rebecca J Shettel at (717)656-2300

Respectfully Submitted,



Robin C. Runkle
Senior Specialist

Langan
Project: SUN: Philadelphia Refinery AOI-6
SDG:

Report Date: 4/7/2006 12:57
Submit Date: 3/22/2006 16:15

Analysis Name	Units	4734387 BH-B156- Result	LOQ**	MDL	4734388 BH-B155- Result	LOQ**	MDL
Lead	mg/kg	1,070.	2.56	1.00	618.	2.70	1.05
Moisture	%	22.0	0.50	0.50	27.3	0.50	0.50
Pyrene	ug/kg	2,500.	210.	43.	2,300.	230.	46.
Naphthalene	ug/kg	370.	210.	43.	700.	230.	46.
Fluorene	ug/kg	1,900.	210.	43.	1,100.	230.	46.
Phenanthrene	ug/kg	4,300.	210.	43.	3,000.	230.	46.
Anthracene	ug/kg	860.	210.	43.	750.	230.	46.
Benzo(a)anthracene	ug/kg	830.	210.	43.	840.	230.	46.
Chrysene	ug/kg	920.	210.	43.	820.	230.	46.
Benzo(b)fluoranthene	ug/kg	1,100.	210.	43.	1,100.	230.	46.
Benzo(a)pyrene	ug/kg	820.	210.	43.	780.	230.	46.
Benzo(g,h,i)perylene	ug/kg	420.	210.	43.	310.	230.	46.
Methyl Tertiary Butyl Ether	ug/kg	< 5.	5.	0.5	< 220.	220.	22.
Benzene	ug/kg	9.	5.	0.5	< 220.	220.	22.
1,2-Dichloroethane	ug/kg	< 5.	5.	0.9	< 220.	220.	44.
Toluene	ug/kg	6.	5.	0.9	< 220.	220.	44.
1,2-Dibromoethane	ug/kg	< 5.	5.	0.9	< 220.	220.	44.
Ethylbenzene	ug/kg	< 5.	5.	0.9	< 220.	220.	44.
Isopropylbenzene	ug/kg	7.	5.	0.9	< 220.	220.	44.
Xylene (Total)	ug/kg	7.	5.	0.9	< 220.	220.	44.

Analysis Name	Units	4734389 BH-20-06 Result	LOQ**	MDL	4734390 BH-21-06 Result	LOQ**	MDL
Lead	mg/kg	145.	2.44	0.951	286.	2.15	0.839
Moisture	%	20.4	0.50	0.50	9.7	0.50	0.50
Pyrene	ug/kg	6,900.	2,100.	420.	< 1,800.	1,800.	370.
Naphthalene	ug/kg	< 2,100.	2,100.	420.	< 1,800.	1,800.	370.
Fluorene	ug/kg	71,000.	4,200.	840.	< 1,800.	1,800.	370.
Phenanthrene	ug/kg	37,000.	2,100.	420.	< 1,800.	1,800.	370.
Anthracene	ug/kg	2,500.	2,100.	420.	< 1,800.	1,800.	370.
Benzo(a)anthracene	ug/kg	3,800.	2,100.	420.	< 1,800.	1,800.	370.
Chrysene	ug/kg	4,200.	2,100.	420.	< 1,800.	1,800.	370.
Benzo(b)fluoranthene	ug/kg	6,300.	2,100.	420.	< 1,800.	1,800.	370.
Benzo(a)pyrene	ug/kg	4,900.	2,100.	420.	< 1,800.	1,800.	370.
Benzo(g,h,i)perylene	ug/kg	2,900.	2,100.	420.	< 1,800.	1,800.	370.
Methyl Tertiary Butyl Ether	ug/kg	< 200.	200.	20.	< 190.	190.	19.
Benzene	ug/kg	290.	200.	20.	340.	190.	19.
1,2-Dichloroethane	ug/kg	< 200.	200.	39.	< 190.	190.	39.
Toluene	ug/kg	410.	200.	39.	< 190.	190.	39.
1,2-Dibromoethane	ug/kg	< 200.	200.	39.	< 190.	190.	39.
Ethylbenzene	ug/kg	460.	200.	39.	810.	190.	39.

** = This limit was used in the evalution of the final result

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Isopropylbenzene	ug/kg	9,700.	2,000.	390.	32,000.	1,900.	390.
Xylene (Total)	ug/kg	1,000.	200.	39.	830.	190.	39.

Analysis Name	Units	4734391 BH-23-06			4734392 BH-24-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	417.	2.48	0.968	233.	2.31	0.902
Moisture	%	20.2	0.50	0.50	14.4	0.50	0.50
Pyrene	ug/kg	1,600.	630.	130.	5,800.	1,900.	390.
Naphthalene	ug/kg	980.	630.	130.	< 1,900.	1,900.	390.
Fluorene	ug/kg	3,500.	630.	130.	63,000.	3,900.	780.
Phenanthrene	ug/kg	7,400.	630.	130.	46,000.	1,900.	390.
Anthracene	ug/kg	1,300.	630.	130.	3,900.	1,900.	390.
Benzo(a)anthracene	ug/kg	790.	630.	130.	< 1,900.	1,900.	390.
Chrysene	ug/kg	1,300.	630.	130.	2,000.	1,900.	390.
Benzo(b)fluoranthene	ug/kg	1,200.	630.	130.	< 1,900.	1,900.	390.
Benzo(a)pyrene	ug/kg	1,100.	630.	130.	< 1,900.	1,900.	390.
Benzo(g,h,i)perylene	ug/kg	890.	630.	130.	< 1,900.	1,900.	390.
Methyl Tertiary Butyl Ether	ug/kg	< 210.	210.	21.	< 170.	170.	17.
Benzene	ug/kg	< 210.	210.	21.	< 170.	170.	17.
1,2-Dichloroethane	ug/kg	< 210.	210.	41.	< 170.	170.	35.
Toluene	ug/kg	< 210.	210.	41.	200.	170.	35.
1,2-Dibromoethane	ug/kg	< 210.	210.	41.	< 170.	170.	35.
Ethylbenzene	ug/kg	< 210.	210.	41.	< 170.	170.	35.
Isopropylbenzene	ug/kg	810.	210.	41.	9,900.	170.	35.
Xylene (Total)	ug/kg	370.	210.	41.	560.	170.	35.

Analysis Name	Units	4734393 BH-25-06			4734394 BH-22-06		
		Result	LOQ**	MDL	Result	LOQ**	MDL
Lead	mg/kg	231.	2.46	0.958	165.	2.16	0.841
Moisture	%	19.4	0.50	0.50	10.	0.50	0.50
Pyrene	ug/kg	11,000.	2,100.	410.	220.	190.	37.
Naphthalene	ug/kg	2,400.	2,100.	410.	< 190.	190.	37.
Fluorene	ug/kg	120,000.	10,000.	2,100.	< 190.	190.	37.
Phenanthrene	ug/kg	120,000.	10,000.	2,100.	< 190.	190.	37.
Anthracene	ug/kg	10,000.	2,100.	410.	< 190.	190.	37.
Benzo(a)anthracene	ug/kg	5,300.	2,100.	410.	< 190.	190.	37.
Chrysene	ug/kg	4,800.	2,100.	410.	< 190.	190.	37.
Benzo(b)fluoranthene	ug/kg	8,100.	2,100.	410.	400.	190.	37.
Benzo(a)pyrene	ug/kg	6,000.	2,100.	410.	350.	190.	37.
Benzo(g,h,i)perylene	ug/kg	3,600.	2,100.	410.	290.	190.	37.
Methyl Tertiary Butyl Ether	ug/kg	< 220.	220.	22.	< 4.	4.	0.4
Benzene	ug/kg	2,300.	220.	22.	< 4.	4.	0.4
1,2-Dichloroethane	ug/kg	< 220.	220.	44.	< 4.	4.	0.7
Toluene	ug/kg	1,700.	220.	44.	< 4.	4.	0.7

** = This limit was used in the evalution of the final result

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1,2-Dibromoethane	ug/kg	< 220.	220.	44.	< 4.	4.	0.7
Ethylbenzene	ug/kg	300.	220.	44.	< 4.	4.	0.7
Isopropylbenzene	ug/kg	2,700.	220.	44.	< 4.	4.	0.7
Xylene (Total)	ug/kg	1,100.	220.	44.	< 4.	4.	0.7

Analysis Name	Units	4734395 BH-29-06 Result	LOQ**	MDL
Lead	mg/kg	2,520.	2.48	0.968
Moisture	%	20.2	0.50	0.50
Pyrene	ug/kg	110,000.	10,000.	2,100.
Naphthalene	ug/kg	2,400.	2,100.	420.
Fluorene	ug/kg	14,000.	2,100.	420.
Phenanthrene	ug/kg	91,000.	10,000.	2,100.
Anthracene	ug/kg	27,000.	2,100.	420.
Benzo(a)anthracene	ug/kg	70,000.	10,000.	2,100.
Chrysene	ug/kg	73,000.	10,000.	2,100.
Benzo(b)fluoranthene	ug/kg	75,000.	10,000.	2,100.
Benzo(a)pyrene	ug/kg	59,000.	10,000.	2,100.
Benzo(g,h,i)perylene	ug/kg	29,000.	2,100.	420.
Methyl Tertiary Butyl Ether	ug/kg	< 230.	230.	23.
Benzene	ug/kg	410.	230.	23.
1,2-Dichloroethane	ug/kg	< 230.	230.	46.
Toluene	ug/kg	< 230.	230.	46.
1,2-Dibromoethane	ug/kg	< 230.	230.	46.
Ethylbenzene	ug/kg	< 230.	230.	46.
Isopropylbenzene	ug/kg	990.	230.	46.
Xylene (Total)	ug/kg	560.	230.	46.

** = This limit was used in the evalution of the final result

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4734387	**BH-B156-032006-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0708	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/31/06 0149	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/27/06 1551	Kenneth L Boley Jr	0.72
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0901	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0903	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0904	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734388	**BH-B155-032006-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0807	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	3/31/06 0521	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1310	Seth J Good	31.81
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0910	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0912	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0913	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734389	**BH-20-06-032006-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0811	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 0148	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 1133	Mark A Clark	20
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1505	Seth J Good	31.37
02308	UST-Soils by 8260B	SW-846 8260B	1	3/27/06 1501	Susan McMahon-Luu	313.68
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0915	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0917	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0918	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734390	**BH-21-06-032006-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0814	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 0241	Linda M Hartenstine	10
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1333	Seth J Good	34.77
02308	UST-Soils by 8260B	SW-846 8260B	1	3/27/06 1438	Susan McMahon-Luu	347.71
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0920	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0923	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0926	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734391	**BH-23-06-032106-1-1.5 Grab Soil Sample**					

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
06955	Lead	SW-846 6010B	1	3/24/06 0818	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/5/06 0057	William T Parker	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1419	Seth J Good	33.03
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0927	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0929	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0930	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	2	4/3/06 1830	Sally L Appleyard	1
4734392	**BH-24-06-032106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0829	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 0518	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 1318	Mark A Clark	20
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1528	Seth J Good	29.69
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0932	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0934	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0936	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734393	**BH-25-06-032106-1-1.5 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0833	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 0610	Linda M Hartenstine	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 1411	Mark A Clark	50
02308	UST-Soils by 8260B	SW-846 8260B	1	3/27/06 2153	Susan McMahon-Luu	35.11
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 0938	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 0939	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 0940	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734394	**BH-22-06-032106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0837	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 0703	Linda M Hartenstine	1
02308	UST-Soils by 8260B	SW-846 8260B	1	3/30/06 1906	Kenneth L Boley Jr	0.64
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 1008	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 1010	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 1012	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1
4734395	**BH-29-06-032106-1.5-2 Grab Soil Sample**					
06955	Lead	SW-846 6010B	1	3/24/06 0840	Eric L Eby	1
00111	Moisture	EPA 160.3 modified	1	3/23/06 1524	Scott W Freisher	1

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/1/06 1503	Mark A Clark	10
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	4/3/06 2008	William T Parker	50
02308	UST-Soils by 8260B	SW-846 8260B	1	3/24/06 1442	Seth J Good	36.55
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	1	3/23/06 1014	Larry E Bevins	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035	2	3/23/06 1016	Larry E Bevins	1
05708	SW SW846 ICP Digest	SW-846 3050B	1	3/23/06 1945	Annamaria Stipkovits	1
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	3/23/06 1017	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	3/26/06 1300	Maryan G Attalla	1

Client Name: Langan Group Number: 982659

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ**	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 060825708001	Sample number(s): 4734387-4734395								
Lead	< 2.00	2.00	0.780	mg/kg	96		84-112		
Batch number: 06082820005A	Sample number(s): 4734387-4734391								
Moisture					100		99-101		
Batch number: 06082820005B	Sample number(s): 4734392-4734395								
Moisture					100		99-101		
Batch number: 06084SLA026	Sample number(s): 4734387-4734390,4734392-4734395								
Pyrene	< 170.	170.	33.	ug/kg	84		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	86		70-103		
Fluorene	< 170.	170.	33.	ug/kg	89		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	87		70-107		
Anthracene	< 170.	170.	33.	ug/kg	84		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	88		73-111		
Chrysene	< 170.	170.	33.	ug/kg	89		72-110		
Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	96		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	95		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	79		66-120		
Batch number: 06093SLE026	Sample number(s): 4734391								
Pyrene	< 170.	170.	33.	ug/kg	82		67-116		
Naphthalene	< 170.	170.	33.	ug/kg	88		70-103		
Fluorene	< 170.	170.	33.	ug/kg	90		66-115		
Phenanthrene	< 170.	170.	33.	ug/kg	78		70-107		
Anthracene	< 170.	170.	33.	ug/kg	79		69-109		
Benzo(a)anthracene	< 170.	170.	33.	ug/kg	84		73-111		
Chrysene	< 170.	170.	33.	ug/kg	83		72-110		

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Benzo(b)fluoranthene	< 170.	170.	33.	ug/kg	84		68-117		
Benzo(a)pyrene	< 170.	170.	33.	ug/kg	85		72-117		
Benzo(g,h,i)perylene	< 170.	170.	33.	ug/kg	85		66-120		

Batch number: Q060792AD Sample number(s): 4734388-4734392,4734395

Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	101	103	75-125	3	30
Benzene	< 250.	250.	25.	ug/kg	99	104	77-119	5	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	104	107	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	99	105	81-116	6	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	105	106	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	100	106	82-115	5	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	101	108	79-117	6	30
Xylene (Total)	< 250.	250.	50.	ug/kg	101	107	82-117	5	30

Batch number: Q060792AE Sample number(s): 4734389-4734390,4734393

Methyl Tertiary Butyl Ether	< 250.	250.	25.	ug/kg	101	103	75-125	3	30
Benzene	< 250.	250.	25.	ug/kg	99	104	77-119	5	30
1,2-Dichloroethane	< 250.	250.	50.	ug/kg	104	107	76-126	3	30
Toluene	< 250.	250.	50.	ug/kg	99	105	81-116	6	30
1,2-Dibromoethane	< 250.	250.	50.	ug/kg	105	106	77-114	1	30
Ethylbenzene	< 250.	250.	50.	ug/kg	100	106	82-115	5	30
Isopropylbenzene	< 250.	250.	50.	ug/kg	101	108	79-117	6	30
Xylene (Total)	< 250.	250.	50.	ug/kg	101	107	82-117	5	30

Batch number: X060811AB Sample number(s): 4734387

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	98	95	75-125	3	30
Benzene	< 5.	5.	0.5	ug/kg	106	101	77-119	4	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	102	99	76-126	3	30
Toluene	< 5.	5.	1.	ug/kg	100	99	81-116	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	98	96	77-114	2	30
Ethylbenzene	< 5.	5.	1.	ug/kg	101	97	82-115	4	30
Isopropylbenzene	< 5.	5.	1.	ug/kg	100	93	79-117	7	30
Xylene (Total)	< 5.	5.	1.	ug/kg	101	96	82-117	4	30

Batch number: X060891AA Sample number(s): 4734394

Methyl Tertiary Butyl Ether	< 5.	5.	0.5	ug/kg	94	94	75-125	0	30
Benzene	< 5.	5.	0.5	ug/kg	105	104	77-119	1	30
1,2-Dichloroethane	< 5.	5.	1.	ug/kg	107	105	76-126	2	30
Toluene	< 5.	5.	1.	ug/kg	104	103	81-116	1	30
1,2-Dibromoethane	< 5.	5.	1.	ug/kg	101	101	77-114	0	30
Ethylbenzene	< 5.	5.	1.	ug/kg	105	101	82-115	4	30

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Isopropylbenzene	< 5.	5.	1.	ug/kg	102	99	79-117	3	30
Xylene (Total)	< 5.	5.	1.	ug/kg	104	101	82-117	3	30

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: 060825708001	Sample number(s): 4734387-4734395 UNSPK: 4734387 BKG: 4734387								
Lead	(2)	(2)	75-125	43*	20	831.	306.	92*	20
Batch number: 06082820005A	Sample number(s): 4734387-4734391 BKG: P733412								
Moisture						24.6	24.3	1	15
Batch number: 06082820005B	Sample number(s): 4734392-4734395 BKG: P734503								
Moisture						13.2	13.4	1	15
Batch number: 06084SLA026	Sample number(s): 4734387-4734390,4734392-4734395 UNSPK: 4734387								
Pyrene	60	81	38-144	16	30				
Naphthalene	71	86	39-129	17	30				
Fluorene	67	85	47-126	14	30				
Phenanthrene	55	77	44-138	13	30				
Anthracene	77	93	38-142	15	30				
Benzo(a)anthracene	74	91	48-132	16	30				
Chrysene	81	104	46-133	20	30				
Benzo(b)fluoranthene	85	103	40-140	15	30				
Benzo(a)pyrene	80	96	38-142	15	30				
Benzo(g,h,i)perylene	47	55	25-154	13	30				
Batch number: 06093SLE026	Sample number(s): 4734391 UNSPK: P741564								
Pyrene	81	76	38-144	5	30				
Naphthalene	81	71	39-129	8	30				
Fluorene	99	115	47-126	11	30				
Phenanthrene	78	75	44-138	2	30				
Anthracene	81	83	38-142	2	30				
Benzo(a)anthracene	87	83	48-132	5	30				

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

Chrysene	90	85	46-133	6	30
Benzo(b)fluoranthene	86	82	40-140	6	30
Benzo(a)pyrene	85	82	38-142	4	30
Benzo(g,h,i)perylene	89	84	25-154	6	30

Batch number: X060811AB Sample number(s): 4734387 UNSPK: P731195

Methyl Tertiary Butyl Ether	97	47-130
Benzene	116	59-120
1,2-Dichloroethane	107	62-130
Toluene	109	49-132
1,2-Dibromoethane	95	62-116
Ethylbenzene	106	50-127
Isopropylbenzene	103	41-120
Xylene (Total)	102	44-127

Batch number: X060891AA Sample number(s): 4734394 UNSPK: P736805

Methyl Tertiary Butyl Ether	92	47-130
Benzene	103	59-120
1,2-Dichloroethane	102	62-130
Toluene	98	49-132
1,2-Dibromoethane	90	62-116
Ethylbenzene	86	50-127
Isopropylbenzene	72	41-120
Xylene (Total)	82	44-127

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: PAHs in Soil by GC/MS
Batch number: 06084SLA026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4734387	97	90	93
4734388	101	90	95
4734389	94	86	89
4734390	109	95	90
4734392	99	76	80
4734393	90	87	87
4734394	96	91	96
4734395	97	85	82
Blank	88	86	91
LCS	89	85	85

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

MS	79	74	75
MSD	94	86	90
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06093SLE026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4734391	91	84	81
Blank	92	91	89
LCS	96	88	91
MS	106	123	89
MSD	102	126*	85
Limits:	47-128	55-123	51-158

Analysis Name: UST-Soils by 8260B
Batch number: Q060792AD

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734388	80	78	77	75
4734389	83	81	74	81
4734390	82	80	94	85
4734391	74	73	77	93
4734392	79	77	83	101
4734395	77	76	87	76
Blank	106	103	102	103
LCS	104	107	102	104
LCSD	104	101	103	102
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: Q060792AE

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734393	81	76	77	101
Blank	110	107	101	102
LCS	104	107	102	104

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

LCSD	104	101	103	102
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: X060811AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734387	84	84	89	86
Blank	88	87	86	87
LCS	88	82	89	86
LCSD	88	85	89	86
MS	85	82	89	85
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Soils by 8260B
Batch number: X060891AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4734394	86	83	90	93
Blank	88	84	92	84
LCS	87	83	91	88
LCSD	86	86	91	86
MS	86	85	93	88
Limits:	71-114	70-109	70-123	70-111

* - Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.
** = This limit was used in the evalution of the final result

QC Comment

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.

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

4734387 BH-B156-032006-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734388 BH-B155-032006-1.5-2 Grab Soil Sample

00111 Moisture
"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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734389 BH-20-06-032006-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734390 BH-21-06-032006-1.5-2 Grab Soil Sample

00111 Moisture

"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.

07804 PAHs in Soil by GC/MS
Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the GC/MS semivolatile compounds were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734391 BH-23-06-032106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

07804 PAHs in Soil by GC/MS
Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734392 BH-24-06-032106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734393 BH-25-06-032106-1-1.5 Grab Soil Sample

00111 Moisture
"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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734394 BH-22-06-032106-1.5-2 Grab Soil Sample

00111 Moisture
"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.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4734395 BH-29-06-032106-1.5-2 Grab Soil Sample

00111 Moisture
"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.

02308 UST-Soils by 8260B
The GC/MS volatile analysis was performed according to the high level soil method due to the level of non-target compounds. Therefore, the reporting limits were raised.

Commonwealth of Pennsylvania Lab Certification No. 36-037

APPENDIX D

Field Sampling Reports

APPENDIX D
GROUNDWATER SAMPLING SUMMARY
AOI-6
SUNOCO PHILADELPHIA REFINERY - GIRARD POINT
PHILADELPHIA, PENNSYLVANIA

Well ID	Date Sampled	Depth to Water (feet)	Total Depth (feet)	Water Column (feet)	Conversion Factor	Well Volume (gallons)	Purge Volume (gallons)
B-115	6/7/2006	3.27	18.00	14.73	0.65	**9.57**	**30.00**
B-116*	8/10/2006	5.82	18.00	12.18	0.65	**7.92**	**25.00**
B-117	6/7/2006	7.13	18.00	10.87	0.65	**7.07**	**22.00**
B-123	6/7/2006	5.24	18.00	12.76	0.65	**8.29**	**26.00**
B-125	6/6/2006	4.94	18.00	13.06	0.65	**8.49**	**26.00**
B-126	6/6/2006	5.12	20.00	14.88	0.65	**9.67**	**30.00**
B-131	6/6/2006	5.60	14.00	8.40	0.65	**5.46**	**17.00**
B-132D	6/6/2006	NM	85.00	NM	0.16	**NM**	**30.00**
B-133D	6/6/2006	11.55	65.00	53.45	0.16	**8.55**	**26.00**
B-134D	6/6/2006	12.67	79.00	66.33	0.16	**10.61**	**32.00**
B-145	6/9/2006	4.78	14.00	9.22	0.65	**5.99**	**20.00**
B-149	6/8/2006	3.15	14.00	10.85	0.65	**7.05**	**22.00**
B-151	6/8/2006	3.44	13.00	9.56	0.65	**6.21**	**19.00**
B-152	6/9/2006	1.29	10.00	8.71	0.65	**5.66**	**18.00**
B-153	6/9/2006	1.59	10.00	8.41	0.65	**5.47**	**18.00**
B-154	6/8/2006	4.17	13.00	8.83	0.65	**5.74**	**18.00**
B-155	6/8/2006	4.96	13.00	8.04	0.65	**5.23**	**16.00**
B-156	6/8/2006	5.14	13.00	7.86	0.65	**5.11**	**16.00**
B-157	6/9/2006	1.75	12.00	10.25	0.65	**6.66**	**20.00**
B-158	6/8/2006	2.93	12.00	9.07	0.65	**5.90**	**18.00**
B-159	6/8/2006	NM	10.00	NM	0.65	**NM**	**15.00**
B-160	6/8/2006	3.50	10.00	6.50	0.65	**4.23**	**13.00**
B-162*	8/10/2006	3.31	18.00	14.69	0.65	**9.55**	**30.00**

APPENDIX D
GROUNDWATER SAMPLING SUMMARY
AOI-6
SUNOCO PHILADELPHIA REFINERY - GIRARD POINT
PHILADELPHIA, PENNSYLVANIA

Well ID	Date Sampled	Depth to Water (feet)	Total Depth (feet)	Water Column (feet)	Conversion Factor	Well Volume (gallons)	Purge Volume (gallons)
B-163	6/9/2006	2.76	10.00	7.24	0.65	**4.71**	**14.00**
B-164	6/6/2006	5.61	15.00	9.39	0.65	**6.10**	**20.00**
B-45	6/8/2006	1.80	15.00	13.20	0.65	**8.58**	**26.00**
B-46	6/7/2006	1.43	15.00	13.57	0.65	**8.82**	**27.00**
B-48	6/8/2006	0.49	14.00	13.51	0.65	**8.78**	**28.00**
B-48D	6/8/2006	12.07	55.00	42.93	0.65	**27.90**	**85.00**
B-92	6/7/2006	5.40	15.50	10.10	0.65	**6.57**	**20.00**
B-94	6/9/2006	6.54	14.00	7.46	0.65	**4.85**	**15.00**
U-1	6/6/2006	7.64	9.00	1.36	0.16	**0.22**	**1.00**
U-2	6/6/2006	6.42	9.00	2.58	0.16	**0.41**	**2.00**
U-4	6/6/2006	3.71	10.00	6.29	0.16	**1.01**	**3.00**
U-5	6/6/2006	6.73	9.00	2.27	0.16	**0.36**	**2.00**
URS-1	6/6/2006	6.07	18.00	11.93	0.65	**7.75**	**24.00**
URS-2	6/6/2006	4.69	18.00	13.31	0.65	**8.65**	**26.00**
URS-3	6/6/2006	4.18	18.00	13.82	0.65	**8.98**	**28.00**
URS-4	6/6/2006	7.35	18.00	10.65	0.65	**6.92**	**20.00**
URS-5	6/6/2006	5.37	18.00	12.63	0.65	**8.21**	**26.00**
WPM-11	6/9/2006	1.29	10.50	9.21	0.16	**1.47**	**5.00**
WPM-8	6/9/2006	8.30	10.50	2.20	0.16	**0.35**	**2.00**
WP16-5	6/9/2006	6.65	10.50	3.85	0.16	**0.62**	**2.00**
WP9-3	6/9/2006	2.66	Not Sampled - LNAPL entered well while bailing				
WP9-4	6/9/2006	5.70	Not Sampled - LNAPL entered well while bailing				

* = Monitoring wells B-116 and B-162 were not accessible during the June sampling event due to flooding. Wells were subsequently sampled on 10 August 2006

APPENDIX E

LNAPL Characterization Data

TABLE E1
LNAPL CHARACTERIZATION RESULTS SUMMARY
AOI 6: SUNOCO PHILADELPHIA REFINERY

Characterization Results Compiled for Current Conditions Report Interpretation of Product Type(s), Proportions and Weathering					
Well ID	**Density (gm/ml @ 60ºF)**	**LNAPL Type(s)**	**Torkleson LNAPL Type(s)**	**Proportions**	**Weathering**
B-129	0.8654	Middle Distillate	Gasoline Heavier Material Middle Distillate	5 20 75	Severe Extreme Extreme
B-130	0.9306	Middle Distillate Residual Oil	Middle Distillate Residual Oil	20 80	Severe Extreme
B-144	0.8654	Gasoline	Gasoline Residual Oil	90 10	Severe Severe
B-39	0.8734	Middle Distillate	Gasoline Middle Distillate	2 98	Severe Severe
B-43	0.9161	Middle Distillate	Middle Distillate	100	Extreme
WP 9-2	0.8114	Gasoline	Aviation Gasoline Middle Distillate	80 20	Severe Severe
Characterization Results Compiled for AOI 6 Site Characterization Interpretation of Product Type(s), Proportions and Weathering					
Well ID	**Density (gm/ml @ 60ºF)**	**LNAPL Type(s)**	**Torkleson LNAPL Type(s)**	**Proportions**	**Weathering**
B-47	0.9796	Residual Oil	Residual Oil Unknown Aromatics	100 Trace	Extreme Extreme
B-150	0.8668	Gasoline	Unknown Aromatics	100	Unknown

Notes:
1. Characterization Data Provided by Torkelson Geochemistry of Tulsa, OK

CHAIN OF CUSTODY

Client Information			Facility Information	
Name: Langan Engineering			Project Name: Sunoco - Philadelphia Refinery AOI-6	
Address: 2700 Kelly Road Suite 200			Location: Philadelphia Refinery	
City: Warrington	State: PA	Zip: 18976	Project No.	
Send Report to: Jason Hanna				
Phone #: (215) 491-6500			FAX #: (215) 491-6501	

Field ID / Point of Collection	Collection: Date	Collection: Time	Collection: Sampled By	Matrix	# of bottles	Preservation: HCL	NaOH	HNO3	H2So4	Na2S2O3	None	Analytical Information: Fingerprint Analysis
LNAPL - B150 - 041206	4/12/2006	1155	MBS		1						x	X
LNAPL - B47 - 041206	4/12/2006	1220	MBS		1						x	X

Turnaround Information

- [x] Standard — Approved By:
- [ ] 14 Days
- [ ] 7 Days
- [ ] Other

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] State Forms

Comments / Remarks

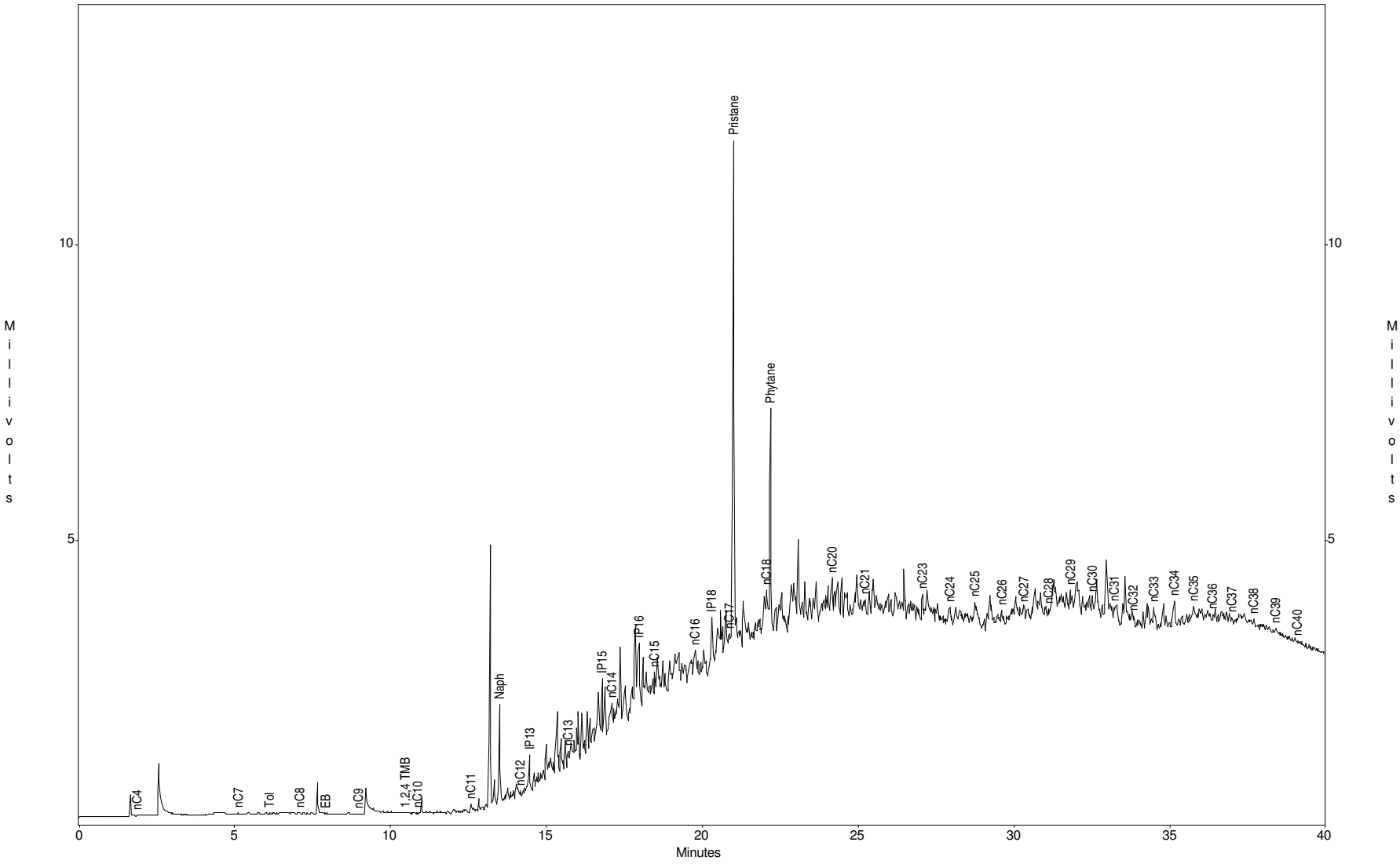
Sample Custody must be documented below each time samples change possesion, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 M. Bled	4/12/06 1015	1 FedEx Air Bill # 8546 0531 9284		4-13-06/1030	2
3		3	4		4
5		5	Seal #	Preserve where applicable ☐	On Ice ☐ Temperature

Torkelson Geochemistry, Inc.

Sunoco - Philadelphia Refinery AOI-6
Sample ID : B47 - 041206
Acquired : Apr 14, 2006 13:14:13

c:\ezchrom\chrom\06045\b47 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco - Philadelphia Refinery AOI-6
Sample ID : B150 - 041206
Acquired : Apr 14, 2006 12:23:26

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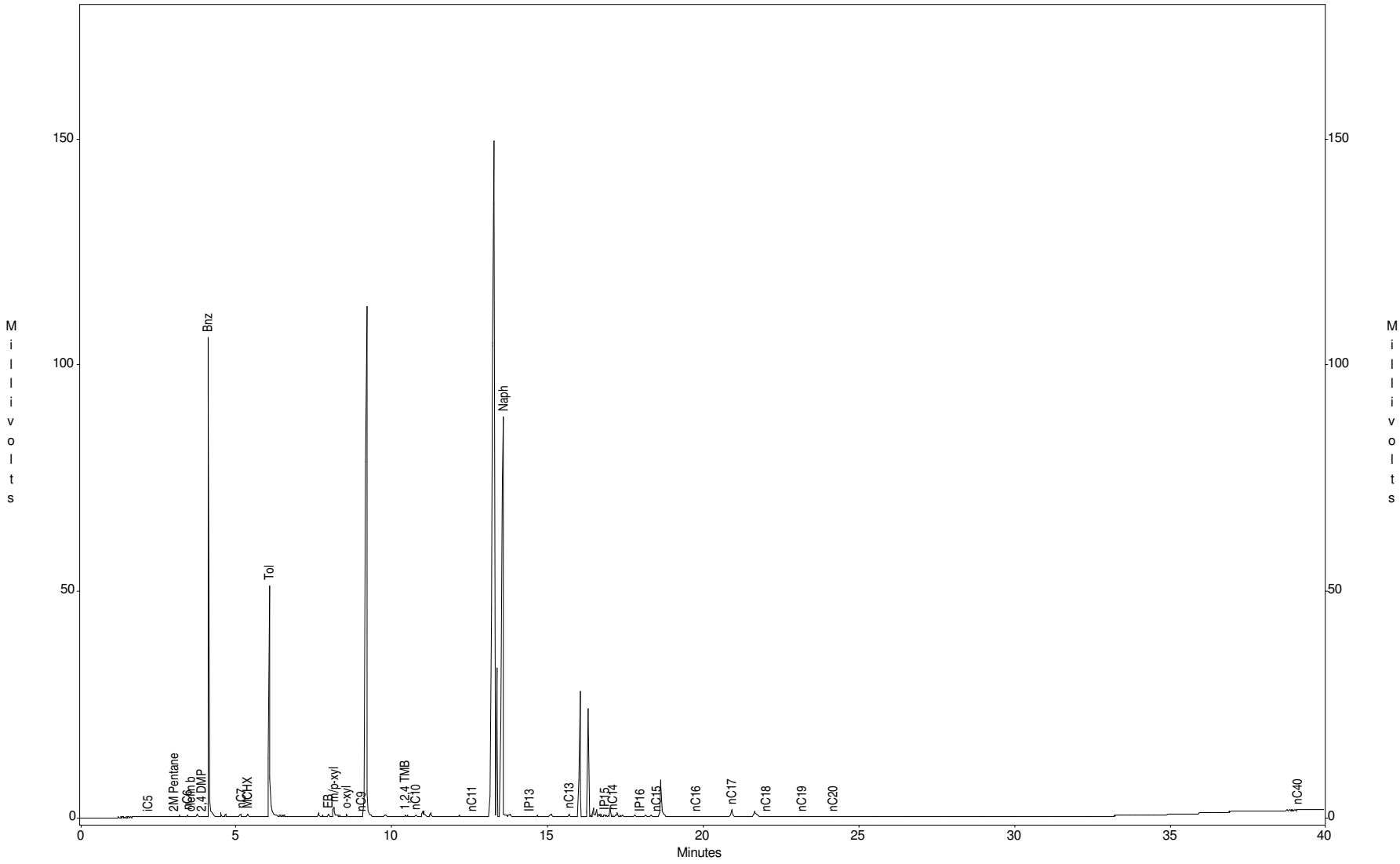
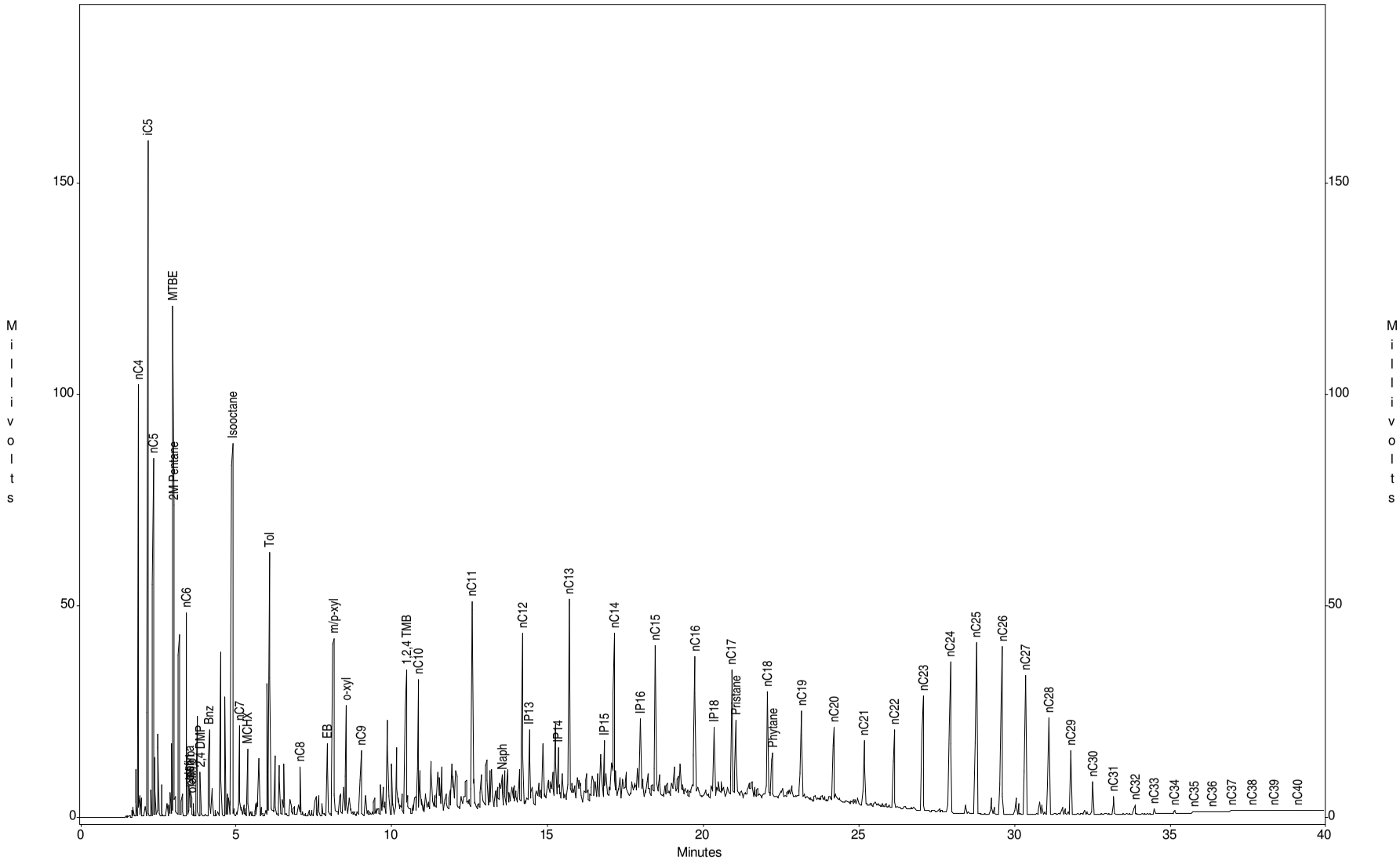


Torkelson Geochemistry, Inc.

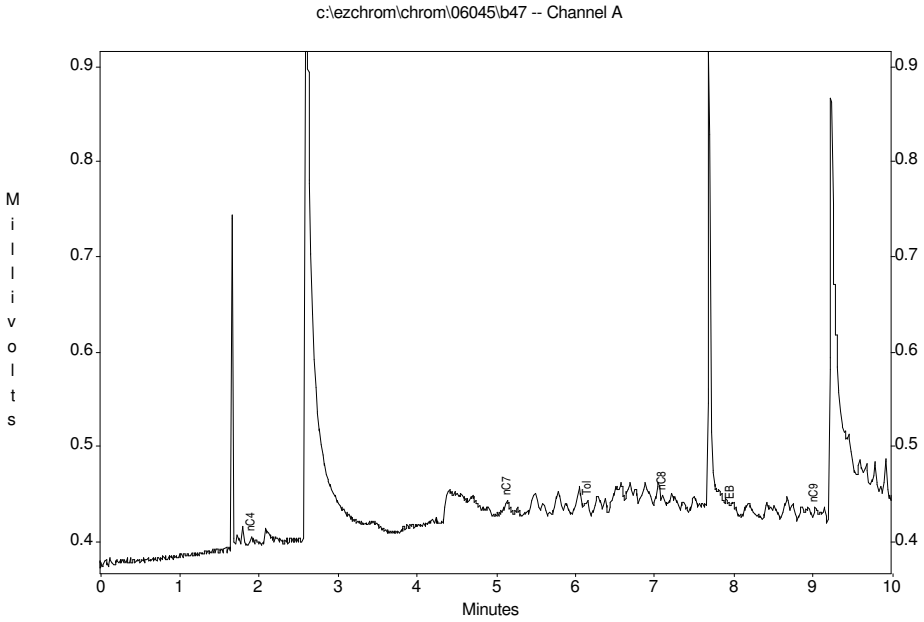
Sunoco - Philadelphia Refinery AOI-6
Sample ID : Gas/Dies/Wax std
Acquired : Apr 14, 2006 10:41:11

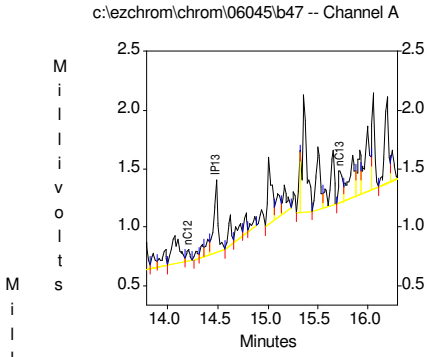
c:\ezchrom\chrom\06045\gadiwax2 -- Channel A

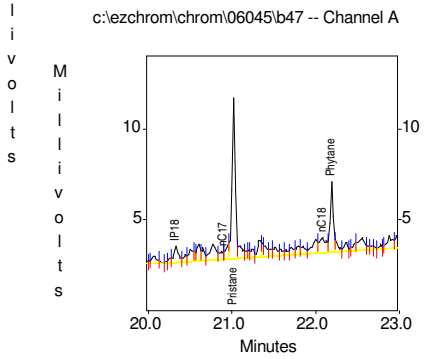


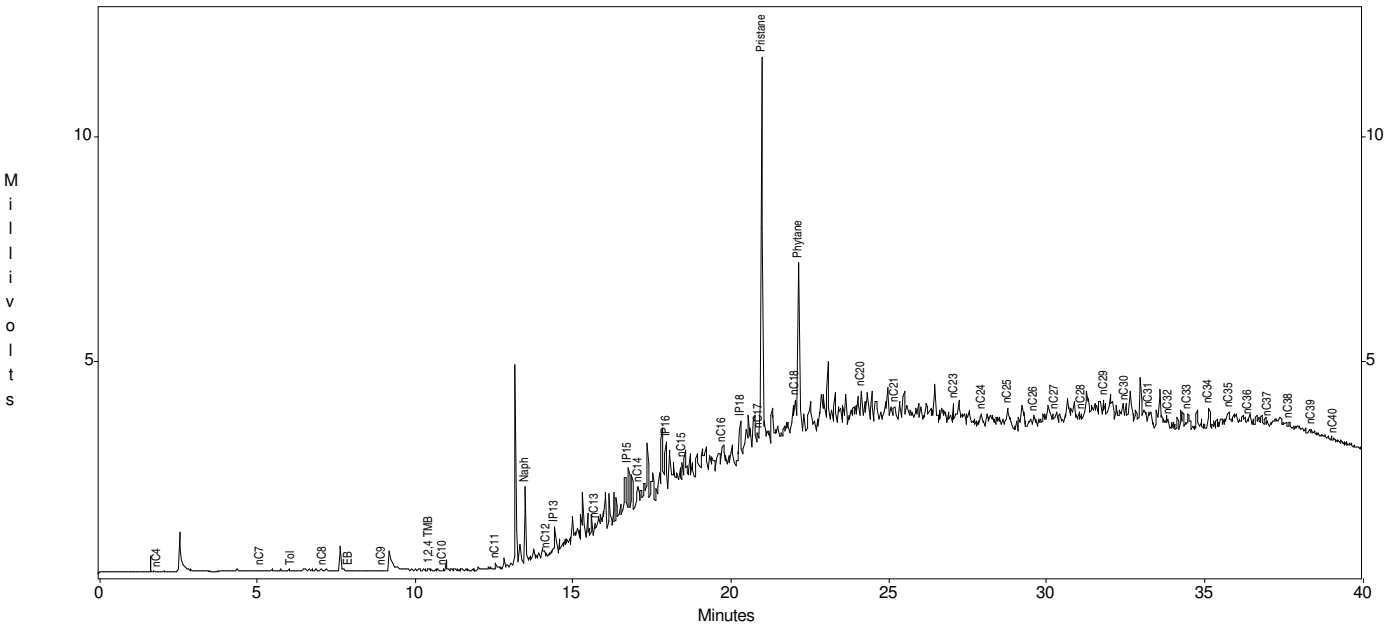
Torkelson Geochemistry, Inc.

Sunoco - Philadelphia Refinery AOI-6
Sample ID : B47 - 041206
Acquired : Apr 14, 2006 13:14:13









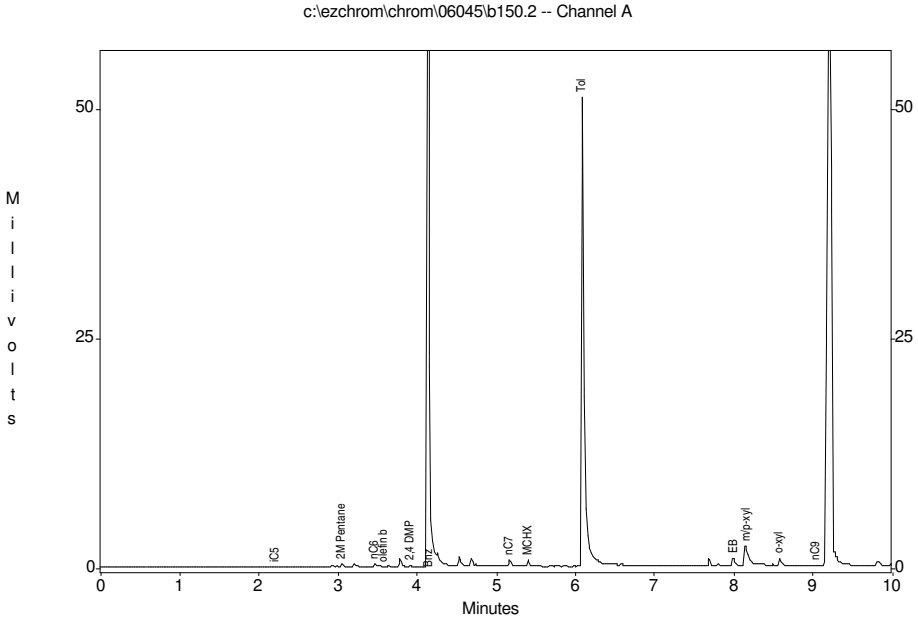
Channel A Results

Peak	Area	Height
nC4	19	8
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	0	0
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	0	0
Bnz	0	0
Isooctane	0	0
nC7	53	13
MCHX	0	0
Tol	56	17
nC8	27	13
EB	51	12
m/p-xyl	0	0
o-xyl	0	0
nC9	41	11
1,2,4 TMB	177	29
nC10	37	18
nC11	325	129
Naph	3762	1682
nC12	220	98
IP13	1770	613
IP14	0	0
nC13	788	271
IP15	2198	1080
nC14	1564	551
IP16	6303	1235
nC15	1657	567
nC16	229	151
IP18	3679	940
nC17	565	489
Pristane	22065	8778
nC18	4773	888
Phytane	10286	3918
nC19	0	0
nC20	2913	712
nC21	1271	303
nC22	0	0
nC23	1438	436
nC24	1258	276
nC25	3281	398
nC26	715	225
nC27	496	115
nC28	180	104
nC29	685	324
nC30	686	237
nC31	194	90
nC32	286	109
nC33	500	190
nC34	577	224
nC35	246	102
nC36	73	79
nC37	34	35
nC38	248	89
nC39	294	79
nC40	81	53

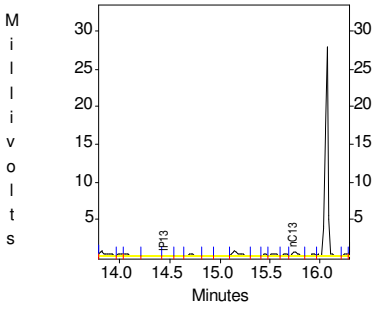
Torkelson Geochemistry, Inc.

Sunoco - Philadelphia Refinery AOI-6
Sample ID : B150 - 041206
Acquired : Apr 14, 2006 12:23:26

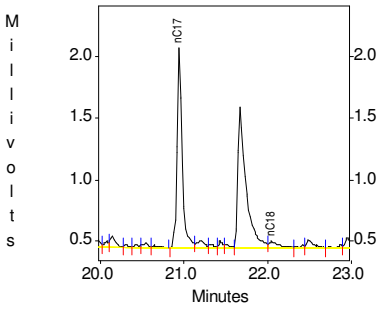
c:\ezchrom\chrom\06045\b150.2 -- Channel A



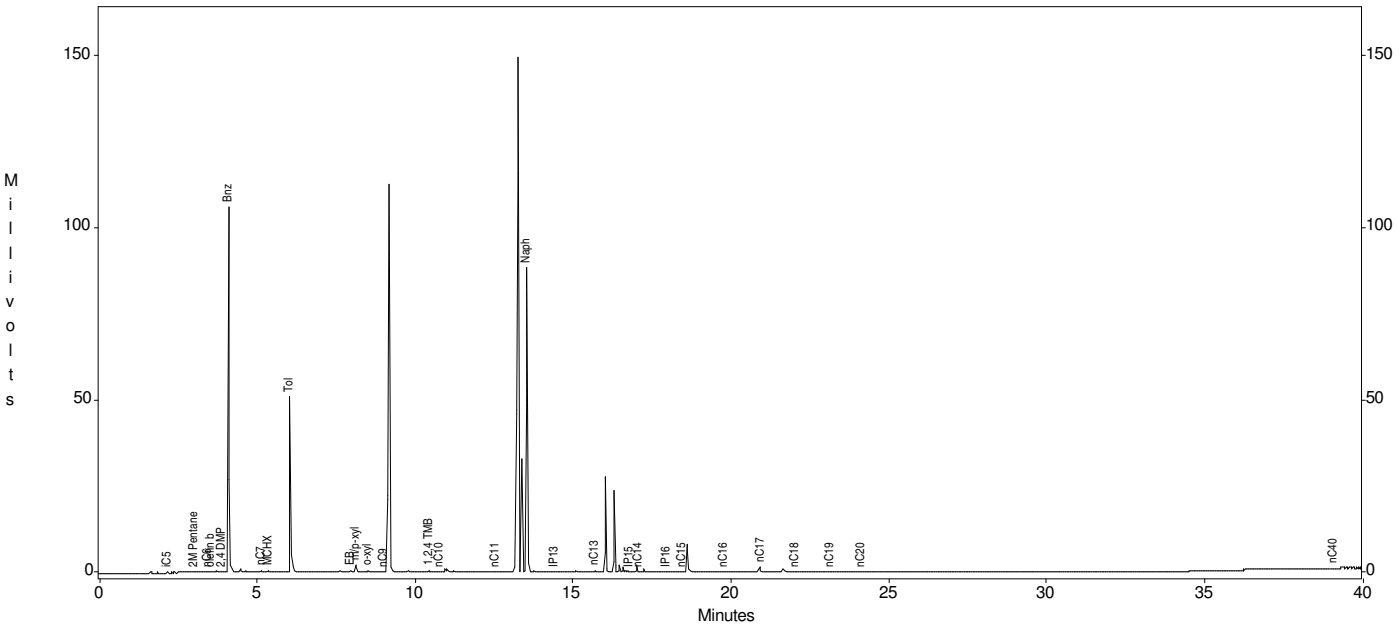
c:\ezchrom\chrom\06045\b150.2 -- Channel A



c:\ezchrom\chrom\06045\b150.2 -- Channel A



c:\ezchrom\chrom\06045\b150.2 -- Channel A



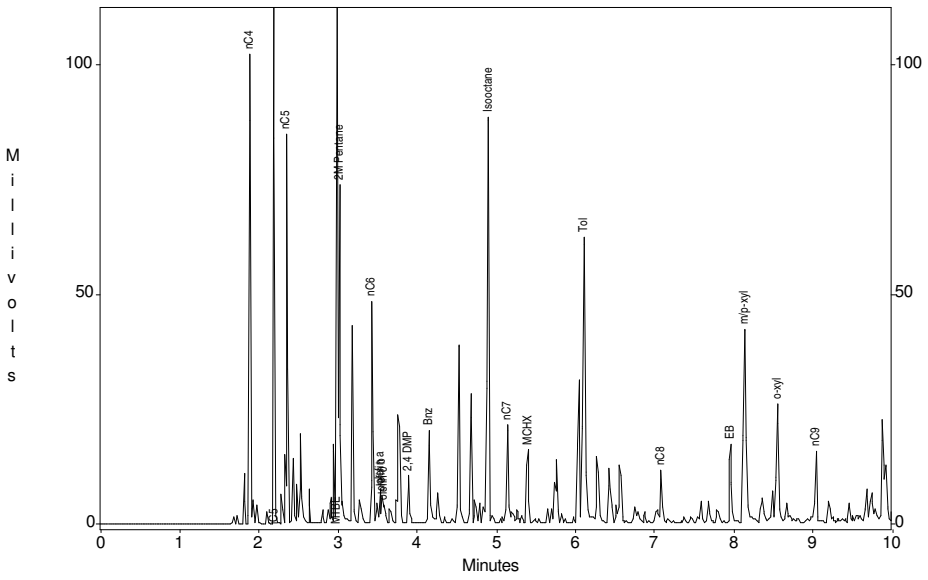
Channel A Results

Peak	Area	Height
nC4	0	0
iC5	20	16
nC5	0	0
MTBE	0	0
2M Pentane	563	283
nC6	841	405
olefin a	0	0
olefin b	67	32
olefin c	0	0
2,4 DMP	193	90
Bnz	160216	106124
Isooctane	0	0
nC7	1845	642
MCHX	1281	623
Tol	103958	51163
nC8	0	0
EB	2805	854
m/p-xyl	8518	2204
o-xyl	2346	857
nC9	486	118
1,2,4 TMB	1217	506
nC10	1188	408
nC11	445	141
Naph	187508	88406
nC12	0	0
IP13	341	94
IP14	0	0
nC13	1792	536
IP15	1178	373
nC14	350	161
IP16	553	142
nC15	213	67
nC16	327	51
IP18	0	0
nC17	6838	1630
Pristane	0	0
nC18	513	54
Phytane	0	0
nC19	443	48
nC20	133	18
nC21	0	0
nC22	0	0
nC23	0	0
nC24	0	0
nC25	0	0
nC26	0	0
nC27	0	0
nC28	0	0
nC29	0	0
nC30	0	0
nC31	0	0
nC32	0	0
nC33	0	0
nC34	0	0
nC35	0	0
nC36	0	0
nC37	0	0
nC38	0	0
nC39	0	0
nC40	61	11

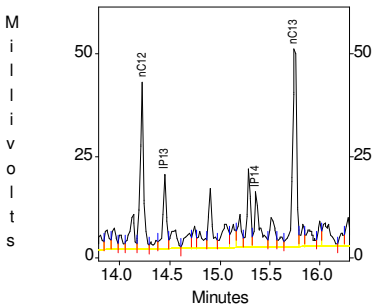
Torkelson Geochemistry, Inc.

Sunoco - Philadelphia Refinery AOI-6
Sample ID : Gas/Dies/Wax std
Acquired : Apr 14, 2006 10:41:11

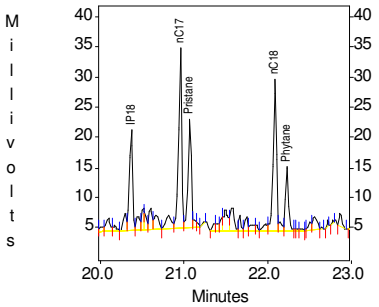
c:\ezchrom\chrom\06045\gadiwax2 -- Channel A



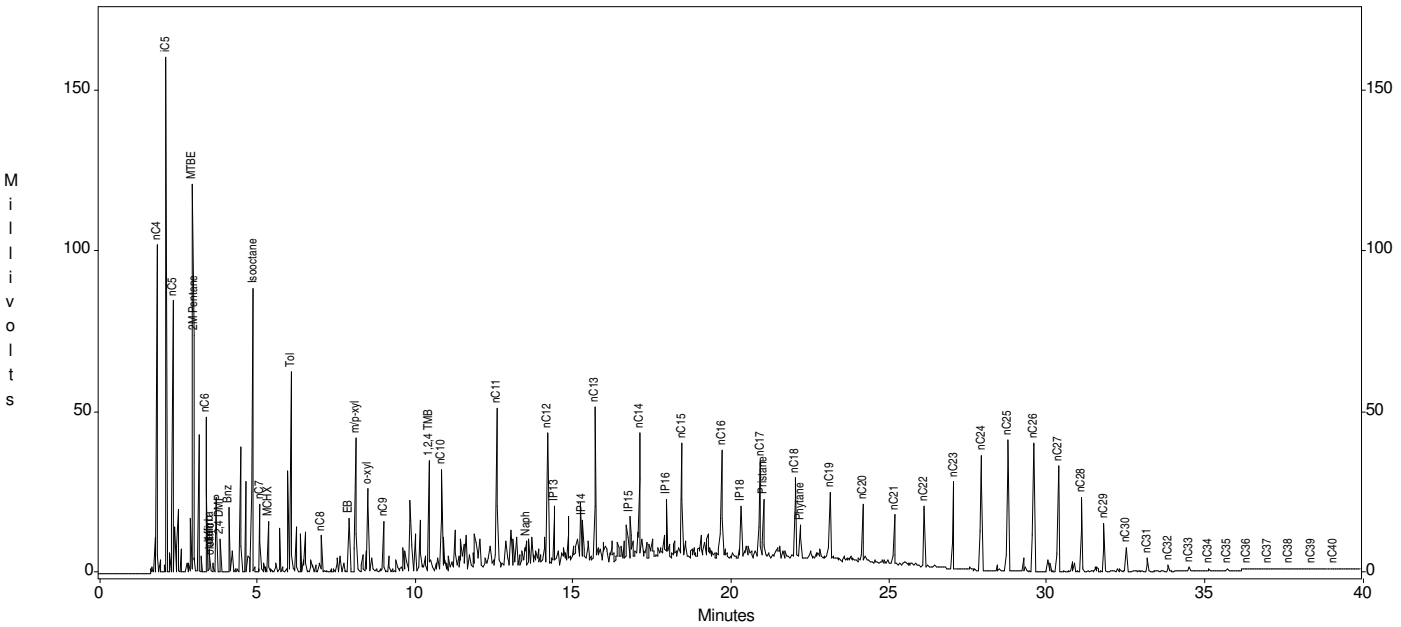
c:\ezchrom\chrom\06045\gadiwax2 -- Channel A



c:\ezchrom\chrom\06045\gadiwax2 -- Channel A



c:\ezchrom\chrom\06045\gadiwax2 -- Channel A



Channel A Results

Peak	Area	Height
nC4	84561	102174
iC5	136768	160088
nC5	79261	84657
MTBE	121512	120527
2M Pentane	80340	73282
nC6	53020	48034
olefin a	8755	7205
olefin b	7290	5882
olefin c	6197	4074
2,4 DMP	12258	10284
Bnz	33741	20370
Isooctane	146709	88291
nC7	33787	21290
MCHX	22936	15953
Tol	124172	62308
nC8	18010	11671
EB	32939	17060
m/p-xyl	107183	41949
o-xyl	46334	25977
nC9	26180	15564
1,2,4 TMB	70113	34041
nC10	57774	31481
nC11	117549	49268
Naph	19267	7884
nC12	101487	41319
IP13	42328	18252
IP14	45498	13651
nC13	131064	48784
IP15	30259	14626
nC14	107287	40013
IP16	48255	19387
nC15	98292	36550
nC16	88751	33660
IP18	39089	16488
nC17	74901	29758
Pristane	44127	17721
nC18	64118	24944
Phytane	26327	10441
nC19	58683	20646
nC20	41787	17745
nC21	35376	15292
nC22	44052	18715
nC23	70927	27082
nC24	109064	35720
nC25	129316	40528
nC26	133116	39579
nC27	103011	33121
nC28	66030	22904
nC29	36616	15210
nC30	17609	7535
nC31	10246	4239
nC32	4790	2112
nC33	2587	1133
nC34	1465	595
nC35	843	324
nC36	538	164
nC37	358	86
nC38	642	45
nC39	353	33
nC40	94	21

CHAIN OF CUSTODY

Client Information		Facility Information	
Name: Langan Engineering		Project Name: Sunoco - Philadelphia Refinery AOI-6	
Address: 2700 Kelly Road Suite 200		Location: Philadelphia Refinery	
City: Warrington	State: PA Zip: 18976	Project No.	
Send Report to: Jason Hanna			
Phone #: (215) 491-6500		FAX #: (215) 491-6501	

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: HCL	NaOH	HNO3	H2So4	Na2S2O3	None	Analytical Information: Fingerprint Analysis
LNAPL - J Avenue	6/9/2006	1210	MBS		2						x	X

Turnaround Information

- [X] Standard — Approved By:
- [ ] 14 Days
- [ ] 7 Days
- [ ] Other _____

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify) _____
- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] State Forms

Comments / Remarks

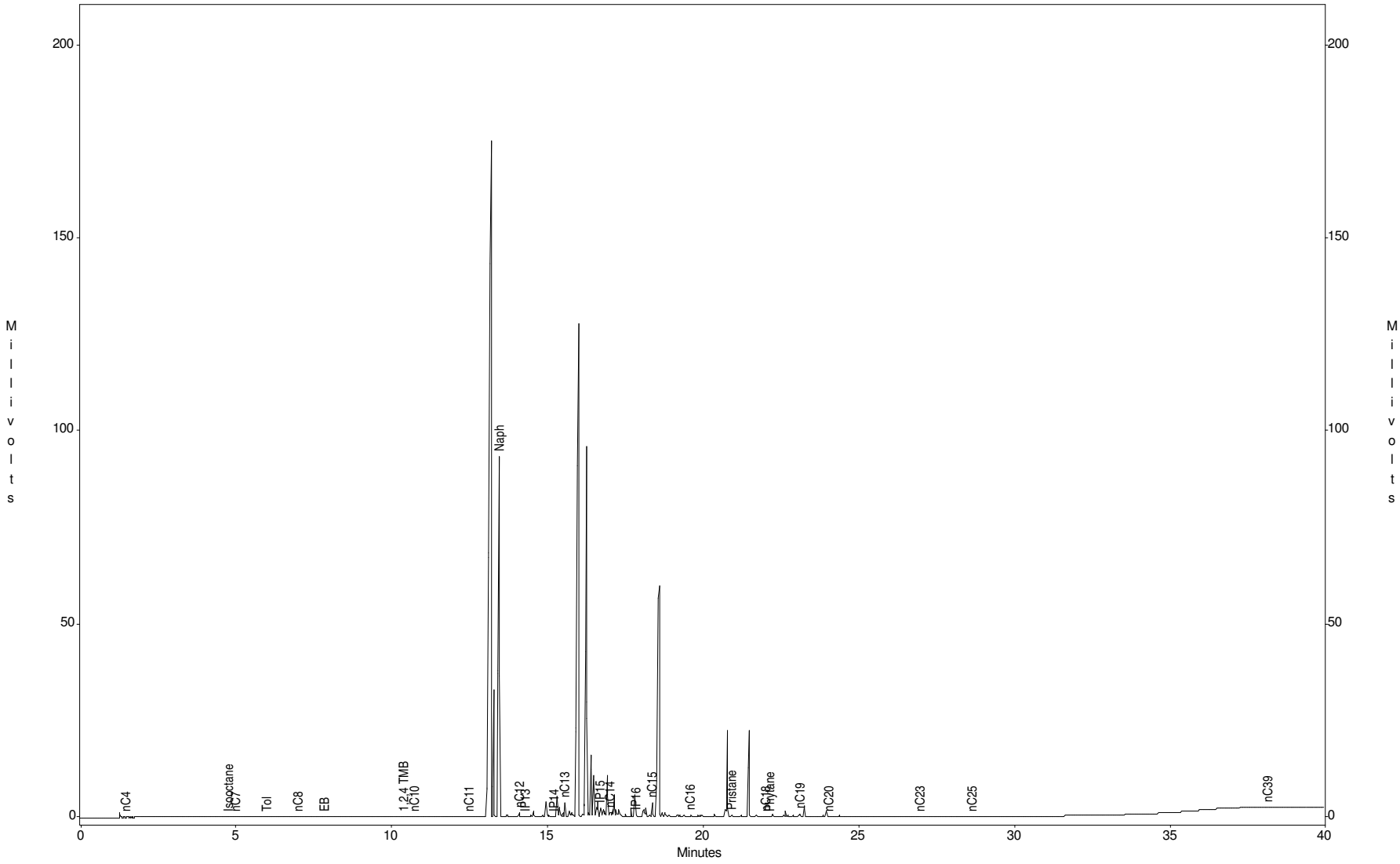
Sample Custody must be documented below each time samples change possesion, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 M. Brad Sh	6/14/06	1 FedEx AirBill 935160 936053	2 →	6-15-06/1005	2 Bruce Tobelman
3		3	4		4
5		5	Seal #	Preserve where applicable ☐	On Ice ☐ Temperature

Torkelson Geochemistry, Inc.

Sunoco - Philadelphi Refinery AOI-6
Sample ID : LNAPL-J Avenue
Acquired : Jun 16, 2006 16:24:59

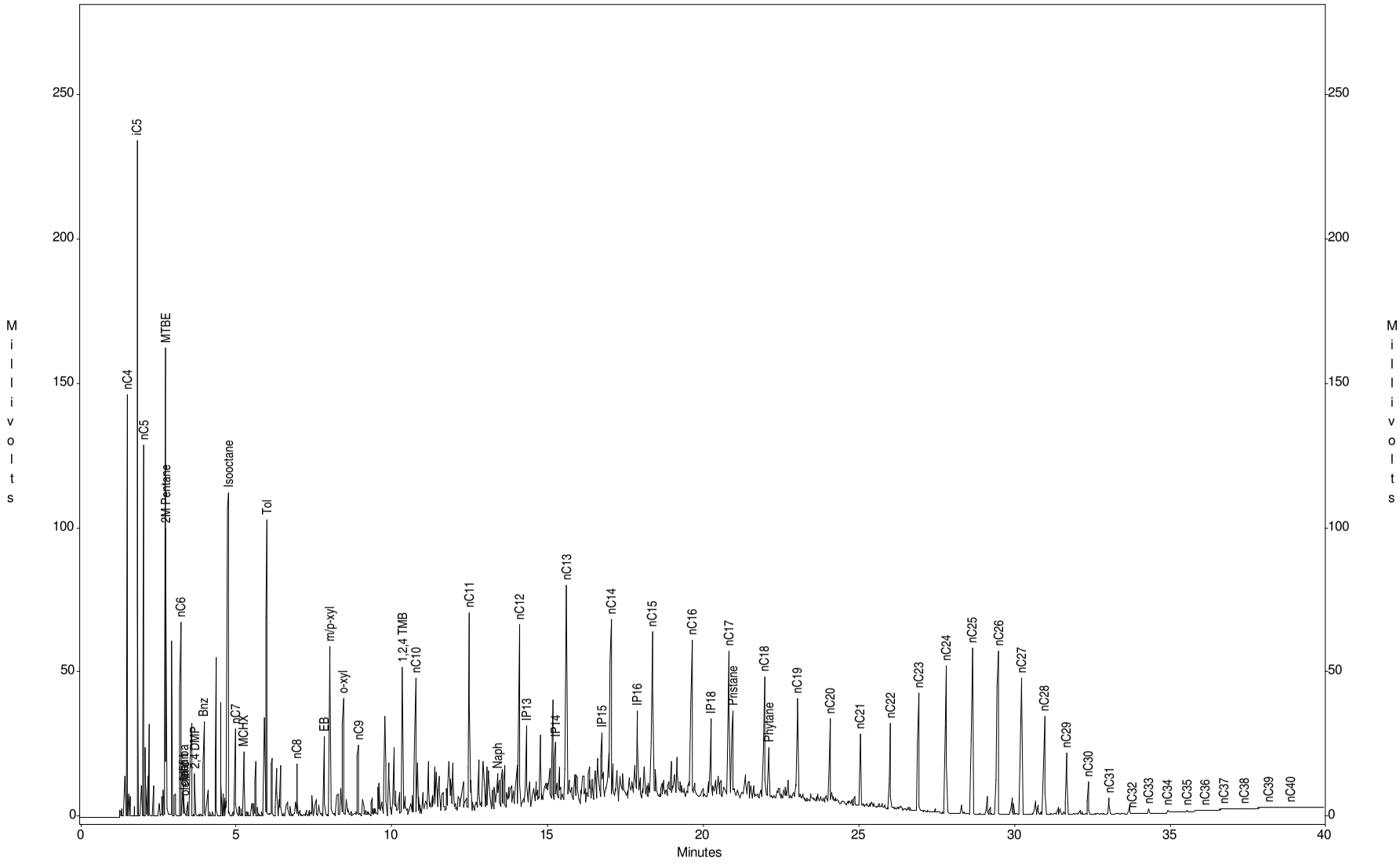
c:\ezchrom\chrom\06075\j-ave.2 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco - Philadelphi Refinery AOI-6
Sample ID : Gas/Dies/Wax std
Acquired : Jun 16, 2006 14:47:45

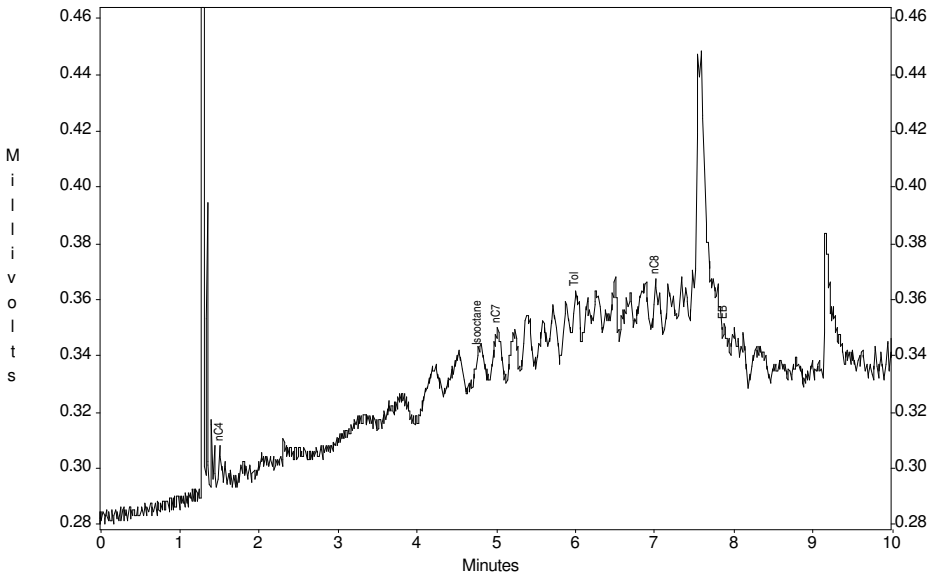
c:\ezchrom\chrom\06075\gadiwax2 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco - Philadelphi Refinery AOI-6
Sample ID : LNAPL-J Avenue
Acquired : Jun 16, 2006 16:24:59

c:\ezchrom\chrom\06075\j-ave.2 -- Channel A



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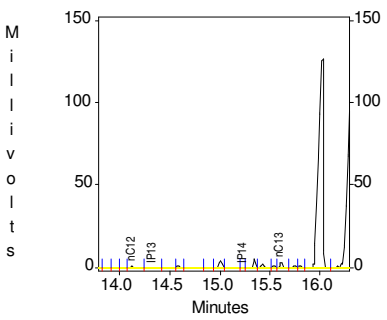
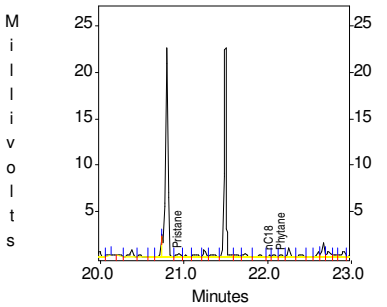
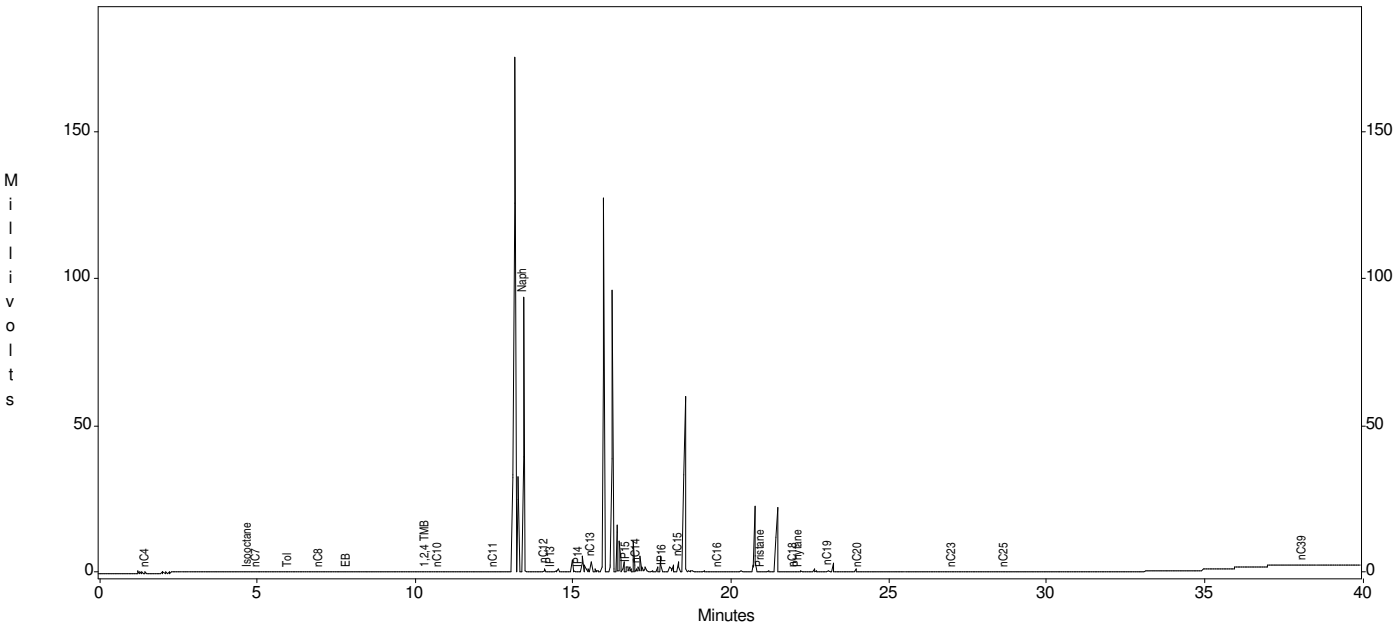


c:\ezchrom\chrom\06075\j-ave.2 -- Channel A



c:\ezchrom\chrom\06075\j-ave.2 -- Channel A



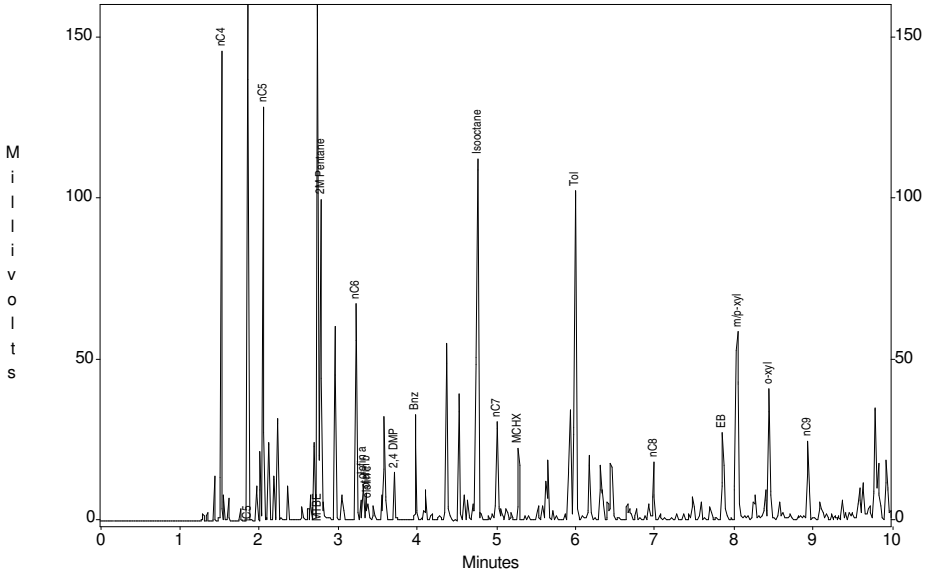
Channel A Results

Peak	Area	Height
nC4	23	15
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	0	0
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	0	0
Bnz	0	0
Isooctane	46	8
nC7	106	18
MCHX	0	0
Tol	110	22
nC8	38	17
EB	18	8
m/p-xyl	0	0
o-xyl	0	0
nC9	0	0
1,2,4 TMB	119	24
nC10	231	35
nC11	394	126
Naph	221610	93625
nC12	2639	1262
IP13	367	110
IP14	197	108
nC13	6767	3770
IP15	7066	2091
nC14	2476	1308
IP16	1479	576
nC15	7156	3795
nC16	755	310
IP18	0	0
nC17	0	0
Pristane	1207	420
nC18	184	83
Phytane	394	180
nC19	2182	694
nC20	588	189
nC21	0	0
nC22	0	0
nC23	109	56
nC24	0	0
nC25	28	12
nC26	0	0
nC27	0	0
nC28	0	0
nC29	0	0
nC30	0	0
nC31	0	0
nC32	0	0
nC33	0	0
nC34	0	0
nC35	0	0
nC36	0	0
nC37	0	0
nC38	0	0
nC39	27	15
nC40	0	0

Torkelson Geochemistry, Inc.

Sunoco - Philadelphi Refinery AOI-6
Sample ID : Gas/Dies/Wax std
Acquired : Jun 16, 2006 14:47:45

c:\ezchrom\chrom\06075\gadiwax2 -- Channel A



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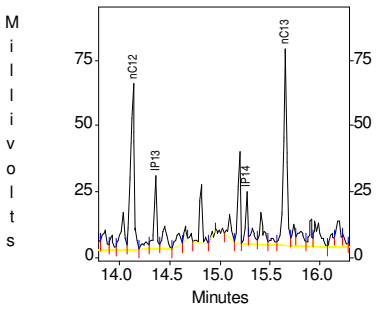
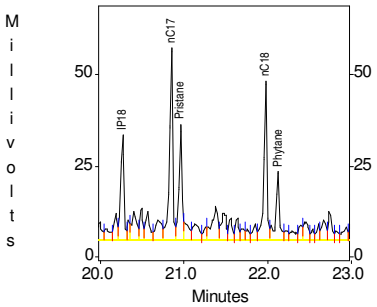
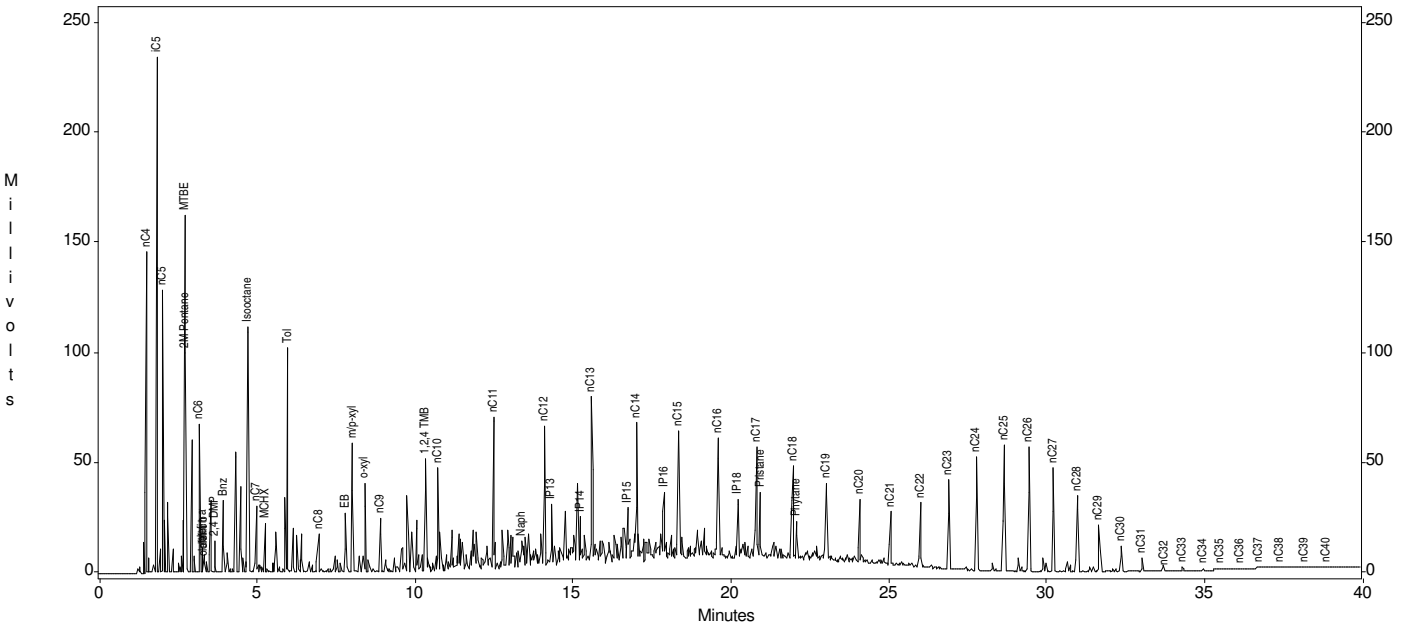


c:\ezchrom\chrom\06075\gadiwax2 -- Channel A



c:\ezchrom\chrom\06075\gadiwax2 -- Channel A



Channel A Results

Peak	Area	Height
nC4	88371	146043
iC5	159578	234318
nC5	93148	128465
MTBE	153284	162193
2M Pentane	94624	99586
nC6	66260	67304
olefin a	11648	11187
olefin b	8877	8578
olefin c	6828	5396
2,4 DMP	15414	14751
Bnz	43704	32699
Isooctane	179549	112012
nC7	39087	30428
MCHX	29101	22333
Tol	166073	102624
nC8	22955	17865
EB	41303	27476
m/p-xyl	146462	58414
o-xyl	63282	40612
nC9	34862	24468
1,2,4 TMB	97586	51102
nC10	79438	46920
nC11	161746	68707
Naph	26912	12104
nC12	146073	63418
IP13	60863	28341
IP14	32472	19921
nC13	180550	74970
IP15	55203	24944
nC14	159843	63744
IP16	77389	31958
nC15	175808	59637
nC16	153384	56327
IP18	70252	29094
nC17	134745	52876
Pristane	83462	31628
nC18	108123	43619
Phytane	58931	18823
nC19	95532	35965
nC20	53488	28061
nC21	50062	24667
nC22	62672	29794
nC23	99772	40754
nC24	150048	51091
nC25	175732	57657
nC26	177197	56544
nC27	134915	47299
nC28	85134	34271
nC29	47484	21434
nC30	22373	11409
nC31	12659	5666
nC32	185	109
nC33	3064	1555
nC34	1695	785
nC35	940	440
nC36	473	200
nC37	469	104
nC38	493	58
nC39	46	24
nC40	15	11

APPENDIX F

Site Specific Cumulative Risk Summary

APPENDIX F
DEVELOPMENT OF SITE-SPECIFIC STANDARDS
AOI 6: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

Based on the current and future intended non-residential site use, an exposure assessment was conducted for all compounds which exceeded the non-residential statewide health standards in AOI 6. Potential human health exposures for the Refinery are for an industrial worker scenario. The media considered included groundwater, surficial soil (less than two feet below grade), and subsurface soil (greater than two feet below grade).

Direct contact issues with soil, groundwater and LNAPL for the industrial scenario are addressed 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 AOI 6 to further evaluate this potentially complete exposure pathway.

Based on the recent characterization data collected, concentrations of benzene, toluene, benzo(a)pyrene, and lead were detected above the non-residential soil MSCs (0-2 feet) in surficial soil in nine of the twenty-one soil samples collected (B-154 – B156, B-162, and BH-25-06 – BH-29-06). In accordance with Section IV of the PADEP's Technical Guidance Manual (dated June 8, 2002), to reduce the list of compounds carried through the risk assessment, the COCs listed above were further screened against the EPA Region III Risk-Based Concentrations RBCs for industrial soil. The results of the screening are provided in Table F-1. As presented in Table F-1, no concentrations of toluene exceed the Region III RBCs; therefore, toluene was dropped from the exposure assessment because it is considered to contribute a minimal influence of total risk.

For the 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 onsite worker and a risk level of 10^{-4}. For calculating a site-specific standard for onsite workers exposed to lead, Sunoco used the Society of Environmental Geochemistry and Health (SEGH) model used by PADEP to develop the non-residential MSCs. The input parameters used to develop the site-specific standards for benzene, benzo(a)pyrene, and lead are provided in Tables F-2, F-3, and F-4, respectively.

The risk-based site-specific standards, presented in Table F-1, for benzene and benzo(a)pyrene were calculated to be 2,152 and 109 mg/kg, respectively. Concentrations of benzene and benzo(a)pyrene detected in the surface soil samples collected in AOI 6 were below the site-specific standards and, therefore, risk to an onsite worker due to exposure is considered to be minimal.

The site-specific standard for lead based on the SEGH model, presented in Table F-1, was calculated to be 1,500 mg/kg. Concentrations of lead detected in the surface soil samples collected in AOI 6 were below the site-specific standard, with the exception of sample location BH-29-06. With the exception to this location, risk to an onsite worker due to exposure is considered minimal. The parameters used in the SEGH model to calculate the site-specific standard for lead are based on site-specific data, where applicable, and are discussed in the following paragraphs.

The model developed by SEGH was used to calculate a site-specific risk based standard for onsite workers exposed to surface soil dependent upon the target blood/lead concentration and the slope of the empirical relationship between blood/lead concentration and soil lead concentration (δ). Based on the SEGH model and PADEP default parameters (Tables F-2 through F-4), PADEP's non-residential MSC for direct contact to lead in soil is 1,000 mg/kg. Based on the method developed by SEGH, PADEP assumes the target blood level (T) is 20 ug/dL blood and the slope of blood lead to soil lead (δ) is 7.5 ug/dL.

To calculate an acceptable risk level for lead at the Sunoco Philadelphia Refinery, PADEP's default blood/lead to soil lead slope value (δ) was adjusted based on site-

specific information and recommendations by the U.K. Environment Agency (Appendix G) and the SEGH. SEGH considered that the reasonable range of δ values was 2 – 5 ug/dL per 1000 ug/g and should be selected based on site-specific information. As stated by the U.K. Environment Agency, low values of δ relate primarily to groups of older children, well maintained (dense) vegetative cover, low bioavailability, heavier textured soils, and good personal grooming habits. Higher values of δ tend to be found in groups of children between the ages of 18 and 24 months, sparse vegetation, soluble lead salts, light textured or soils with low organic matter, and poor personal grooming habits.

Based on the characteristics of the soil at the refinery, the PADEP default blood/lead to soil lead slope value (δ) was adjusted from 7.5 ug/dL to 5.0 ug/dL. As presented in Table F-3, the calculated site-specific standard for lead in surface soil based on the above outlined parameters is 1,500 mg/kg. As presented in Table F-1, concentrations of lead detected in the surface soil samples collected in AOI 6 were below the site-specific standard with the exception of sample location BH-29-06. With exception to this location, risk to an onsite worker due to exposure is considered minimal. Potential lead exposure within the area of BH-29-06 will be addressed by Sunoco through implementation of a remedy which will either remediate the lead concentration in shallow soil or eliminate the potential pathway to onsite workers.

In addition to calculating the site-specific standards for benzene, benzo(a)pyrene, and lead, the cumulative risk of exposure to benzene and benzo(a)pyrene was also calculated. As discussed above, lead exposure is dependent on the blood/lead concentration and not risk based; therefore, lead could not be incorporated into the cumulative risk calculation. Cumulative risk, presented in Table F-5, is the combined risk of exposure to the maximum concentrations of benzene and benzo(a)pyrene and, in accordance with the TGM, can not exceed 10^{-4}. The total cumulative risk of exposure to the COCs in AOI 6 was calculated to be 6.27E-5, an order of magnitude less than the PADEP's requirement of 10^{-4}.

Table F-1
Summary of Soil Sample Analytical Results Exceeding the PADEP MSCs
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs 0-2' Dry	EPA Region 3 RBCs Industrial Soil	Site Specific Screening Criteria Non-Residential (Onsite Worker)	Location ID Sample ID Sample Matrix Sample Interval Sample Date	B-151 BH-B151-030106-0.5-1 Soil 0.5-1.0 3/1/2006			B-152 BH-B152-030106-1.5-2 Soil 1.5-2.0 3/1/2006			B-153 BH-B153-030106-1.5-2 Soil 1.5-2.0 3/1/2006			B-154 BH-B154-030106-1-1.5 Soil 1.0-1.5 3/1/2006			B-155 BH-B155-032006-1.5-2 Soil 1.5-2.0 3/20/2006			B-156 BH-B156-032006-1-1.5 Soil 1.5-2.0 3/20/2006			B-157 BH-B157-030106-1-1.5 Soil 1.0-1.5 3/1/2006		
					Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Toluene	108-88-3	100	82000	NR	mg/kg	ND	U	0.2	ND	U	0.2	ND	U	0.42	0.24		0.16	ND	U	0.22	0.006		0.005	ND	U	0.24
Benzene	71-43-2	0.5	52	0	mg/kg	ND	U	0.2	**0.46**		0.2	ND	U	0.42	**3.6**		0.16	ND	U	0.22	**0.009**		0.005	ND	U	0.24
Benzo(a)pyrene	50-32-8	11	0.39	0	mg/kg	**1.7**		0.92	ND	U	3	ND	U	0.28	ND	U	5.8	**0.78**		0.23	**0.82**		0.21	**1.5**		1.1
Lead (Total)	7439-92-1	450	--	1,500	mg/kg	198		10.6	27		2.32	66.3		3.38	410		2.29	**618**		2.7	**1070**		2.56	178		2.55

Notes:

PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
mg/kg - milligram per kilogram
MSC - PADEP's Medium Specific Concentration for Soil
RBC - Risk Based Criteria (Based on April 2006 Updated Values)
RL - Reporting Limit
ND - Not Detected
NA - Not Analyzed

NR - a site specific number was not required for toluene because none of the concentrations detected exceed the Region 3 RBCs
(1) All soil samples collected and analyzed were unsaturated.
(2) BH-20-06, BH-21-06, B-161, & B-162 are located in SWMU areas. No suspected lead tank bottom materials were observed; however, soil samples were collected and analyzed for site COCs.

Qualifiers:

Q - Qualifier
U - The analyte was analyzed but not detected

Exceedance Summary:

10 - Concentration exceeds the PADEP Non-Residential Soil MSC
10 - Concentration exceeds the EPA Region 3 RBCs for Industrial Soils
10 - Concentration exceeds the Site Specific Screening Criteria

Table F-1
Summary of Soil Sample Analytical Results Exceeding the PADEP MSCs
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs 0-2' Dry	EPA Region 3 RBCs Industrial Soil	Site Specific Screening Criteria Non-Residential (Onsite Worker)	Location ID Sample ID Sample Matrix Sample Interval Sample Date	B-160 BH-B160-030106-1-1.5 Soil 1.0-1.5 3/1/2006			B-161 BH-B161-030106-1.5-2 Soil 1.5-2.0 3/1/2006			B-162 BH-B162-030106-1-1.5 Soil 1.0-1.5 3/1/2006			B-164 BH-B164-030106-1.5-2 Soil 1.5-2.0 3/1/2006			BH-20-06 BH-20-06-032006-1-1.5 Soil 1.0-1.5 3/20/2006			BH-21-06 BH-21-06-032006-1.5-2 Soil 1.5-2.0 3/20/2006			BH-22-06 BH-22-06-032106-1.5-2 Soil 1.5-2.0 3/21/2006		
					Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Toluene	108-88-3	100	82000	NR	mg/kg	ND	U	0.005	ND	U	0.44	ND	U	0.005	ND	U	0.37	0.41		0.2	ND	U	0.19	ND	U	0.004
Benzene	71-43-2	0.5	52	0	mg/kg	ND	U	0.005	ND	U	0.44	ND	U	0.005	ND	U	0.37	**0.29**		0.2	**0.34**		0.19	ND	U	0.004
Benzo(a)pyrene	50-32-8	11	0.39	0	mg/kg	ND	U	0.22	**2.2**		0.21	**0.22**		0.18	**0.41**		0.2	**4.9**		2.1	ND	U	1.8	**0.35**		0.19
Lead (Total)	7439-92-1	450	--	1,500	mg/kg	30.8		2.54	70.1		2.48	**584**		2.09	18.5		2.41	145		2.44	286		2.15	165		2.16

Notes:

PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
mg/kg - milligram per kilogram
MSC - PADEP's Medium Specific Concentration for Soil
RBC - Risk Based Criteria (Based on April 2006 Updated Values)
RL - Reporting Limit
ND - Not Detected
NA - Not Analyzed

NR - a site specific number was not required for toluene because none of the concentrations detected exceed the Region 3 RBCs
(1) All soil samples collected and analyzed were unsaturated.
(2) BH-20-06, BH-21-06, B-161, & B-162 are located in SWMU areas. No suspected lead tank bottom materials were observed; however, soil samples were collected and analyzed for site COCs.

Qualifiers:

Q - Qualifier
U - The analyte was analyzed but not detected

Exceedance Summary:

10 - Concentration exceeds the PADEP Non-Residential Soil MSC
10 - Concentration exceeds the EPA Region 3 RBCs for Industrial Soils
10 - Concentration exceeds the Site Specific Screening Criteria

Table F-1
Summary of Soil Sample Analytical Results Exceeding the PADEP MSCs
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

	CAS No	PADEP Non-Residential Soil MSCs 0-2' Dry	EPA Region 3 RBCs Industrial Soil	Site Specific Screening Criteria Non-Residential (Onsite Worker)	Location ID Sample ID Sample Matrix Sample Interval Sample Date	BH-23-06 BH-23-06-032106-1-1.5 Soil 1-1.5 3/21/2006			BH-24-06 BH-24-06-032106-1-1.5 Soil 1-1.5 3/21/2006			BH-25-06 BH-25-06-032106-1-1.5 Soil 1-1.5 3/21/2006			BH-26-06 BH-26-06-032406-0.5-1 Soil 0.5-1.0 3/24/2006			BH-27-06 BH-27-06-032306-1-1.5 Soil 1-1.5 3/23/2006			BH-28-06 BH-28-06-032306-1-1.5 Soil 1-1.5 3/23/2006			BH-29-06 BH-29-06-032106-1.5-2 Soil 1.5-2.0 3/21/2006		
					Unit	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Toluene	108-88-3	100	82000	NR	mg/kg	ND	U	0.21	0.2		0.17	1.7		0.22	**260**		18	ND	U	0.18	0.59		0.38	ND	U	0.23			
Benzene	71-43-2	0.5	52	0	mg/kg	ND	U	0.21	ND	U	0.17	**2.3**		0.22	**180**		18	**2.2**		0.18	**1.3**		0.38	**0.41**		0.23			
Benzo(a)pyrene	50-32-8	11	0.39	0	mg/kg	**1.1**		0.63	ND	U	1.9	6		2.1	ND	U	0.18	ND	U	1.9	**4.2**		0.96	**59**		10			
Lead (Total)	7439-92-1	450	--	1,500	mg/kg	417		2.48	233		2.31	231		2.46	32.6		2.15	167		2.26	200		2.23	**2520**		2.48			

Notes:

PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
mg/kg - milligram per kilogram
MSC - PADEP's Medium Specific Concentration for Soil
RBC - Risk Based Criteria (Based on April 2006 Updated Values)
RL - Reporting Limit
ND - Not Detected
NA - Not Analyzed

NR - a site specific number was not required for toluene because none of the concentrations detected exceed the Region 3 RBCs
(1) All soil samples collected and analyzed were unsaturated.
(2) BH-20-06, BH-21-06, B-161, & B-162 are located in SWMU areas. No suspected lead tank bottom materials were observed; however, soil samples were collected and analyzed for site COCs.

Qualifiers:

Q - Qualifier
U - The analyte was analyzed but not detected

Exceedance Summary:

10 - Concentration exceeds the PADEP Non-Residential Soil MSC
10 - Concentration exceeds the EPA Region 3 RBCs for Industrial Soils
10 - Concentration exceeds the Site Specific Screening Criteria

Table F-2
Derivation of Site-Specific Soil Value
for Benzene[1]

Parameter	Abbreviation	Assumption	Units	Source
Transport Factor	TF	13100	mg/kg / mg/m^3	25 Pa. Code § 250, Appendix A Table 5
Absorption	Abs	1	unitless	25 Pa. Code § 250.307(d)
Exposure Time	ET	8	hr/day	25 Pa. Code § 250.307(d)
Exposure Frequency	EF	1.80E+02	d/yr	25 Pa. Code § 250.307(d)
Exposure Duration	ED	2.50E+01	yr	25 Pa. Code § 250.307(d)
Target Risk[2]	TR	0.0001	mg/kg	
Inhalation Cancer Slope Factor	CSF_I	0.027	$mg/kg\text{-}day^{-1}$	25 Pa. Code § 250, Appendix A Table 5
Averaging Time for Carcinogens	AT_C	70	yr	25 Pa. Code § 250.307(d)
Inhalation Factor	IF_{ADJ}	0.4	unitless	25 Pa. Code § 250.307(d)

Site-Specific, Non-Residential (Onsite Worker) Screening Value **2152** **mg/kg**

Notes:

1. The site specific screening value for Benzene was calculated for inhalation based on the calculation specified in 25 Pa. Code 250.307(b)(1)

$$MSC\ (mg/kg) = \frac{TR \times AT_C \times 365\ days/year \times TF}{CSF_I \times Abs \times ET \times EF \times IF_{ADJ}}$$

2. The target risk level was modified from PADEP's default (1E-5) to 1E-4.

Table F-3
Derivation of Site-Specific Soil Value
for Benzo(a)pyrene[1]

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[2]	TR	1.00E-04	mg/kg	
Oral Cancer Slope Factor	CSF_o	7.3	$mg/kg\text{-}day^{-1}$	25 Pa. Code § 250, Appendix A Table 5
Averaging Time for Carcinogens	At_c	70	yr	25 Pa. Code § 250.306(d)
Ingestion Factor	Ifadj	17.9	mg-yr/kg-day	25 Pa. Code § 250.306(d)

Site-Specific, Non-Residential (Onsite Worker) Screening Value **108.63** **mg/kg**

Notes:

1. The site specific screening value for Benzo(a)pyrene was calculated for ingestion based on the calculation specified in 25 Pa. Code 250.306(b)

$$MSC\ (mg/kg) = \frac{TR \times AT_C \times 365\ days/year}{CSF_O \times Abs \times EF \times IF_{ADJ} \times CF}$$

2. The target risk level was modified from PADEP's default (1E-5) to 1E-4.

Table F-4
Derivation of Site-Specific Soil Value
for Lead[1]

Parameter	Abbreviation	Assumption	Units	Source
Blood lead target concentration	T	20	ug/dL	25 Pa. Code § 250, Appendix A Table 7
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	4	ug/dL	25 Pa. Code § 250, Appendix A Table 7
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	5	ug/dL blood / ug/g soil	Soil Guideline Values for Lead Conatmination (U.K.E.A., 2002)

Site-Specific, Non-Residential (Onsite Worker) Screening Value **1500** **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)

$$MSC\ (mg/kg) = \frac{[(T/G^{n}) - B] \times 1000}{\delta}$$

Table F-5
Summary of Site Specific Cumulative Risk Evaluation
AOI 6 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

			Calculated Risk	
Location ID	Sample Interval	Sample Date	Benzene (71-43-2)	Benzo(a)pyrene (50-32-8)
B-151	0.5-1.0	03/01/06	ND	1.56E-06
B-152	1.5-2.0	03/01/06	2.14E-08	ND
B-153	1.5-2.0	03/01/06	ND	ND
B-154	1.0-1.5	03/01/06	1.67E-07	ND
B-155	1.5-2.0	03/20/06	ND	7.18E-07
B-156	1.5-2.0	03/20/06	4.18E-10	7.55E-07
B-157	1.0-1.5	03/01/06	ND	1.38E-06
B-160	1.0-1.5	03/01/06	ND	ND
B-161	1.5-2.0	03/01/06	ND	2.03E-06
B-162	1.0-1.5	03/01/06	ND	2.03E-07
B-164	1.5-2.0	03/01/06	ND	3.77E-07
BH-20-06	1.0-1.5	03/20/06	1.35E-08	4.51E-06
BH-21-06	1.5-2.0	03/20/06	1.58E-08	ND
BH-22-06	1.5-2.0	03/21/06	ND	3.22E-07
BH-23-06	1-1.5	03/21/06	ND	1.01E-06
BH-24-06	1-1.5	03/21/06	ND	ND
BH-25-06	1-1.5	03/21/06	1.07E-07	5.52E-06
BH-26-06	0.5-1.0	03/24/06	**8.36E-06**	ND
BH-27-06	1-1.5	03/23/06	1.02E-07	ND
BH-28-06	1-1.5	03/23/06	6.04E-08	3.87E-06
BH-29-06	1.5-2.0	03/21/06	1.91E-08	**5.43E-05**
		TOTAL CUMULATIVE RISK		**6.27E-05**

Notes:

ND - Not Detected

BOLD - Indicates the location posing the maximum risk of exposure.

(1) All soil samples collected and analyzed were unsaturated.

(2) BH-20-06, BH-21-06, B-161, & B-162 are located in SWMU areas.

(3) Total Cumulative Risk is the combined risk of exposure to the maximum concentrations of benzene and BaP.

APPENDIX G

SEGH Documentation

Department for Environment, Food and Rural Affairs
The Environment Agency

SOIL GUIDELINE VALUES FOR LEAD CONTAMINATION

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Dissemination Status
Internal: Released to Regions
External: Released to Public Domain

Statement of Use
This publication sets out the derivation of the Soil Guideline Values for lead contamination. The report has been written for technical professionals who are familiar with the assessment and management of the risks posed by land contamination to human health. It is expected to be of use to all parties involved with or interested in contamination, but in particular to those concerned with the assessment of land contamination.

Keywords
Soil Guideline Values, lead, land contamination, priority contaminants, risk assessment.

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1 Introduction

1.1 This report is one of a series of documents issued by the Department for Environment, Food and Rural Affairs (DEFRA), its predecessor departments, and more recently the Environment Agency. The main purpose of the CLR series is to provide regulators, developers, landowners and other interested parties with relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risks arising from the presence of soil contamination.

1.2 This report describes Soil Guideline Values, generic assessment criteria for assessing the risks to human health from chronic exposure to soil contaminated with lead. It is essential that the information presented here be used in conjunction with an understanding of the main reports in this series (see Table 1.1) and the wider context of assessing environmental risk (DETR, Environment Agency and IEH, 2000).

1.3 This technical material can be used in support of the application of the statutory regimes addressing land contamination, especially Part IIA of the Environmental Protection Act 1990 (the contaminated land regime) and development control under the Town and Country Planning Acts. In particular, they are intended to be regarded as "relevant information", and to assist in the assessment of "relevant and available evidence", for the purposes of paragraphs A.31, B.39 and B.44–B.49 of the Part IIA statutory guidance contained in DETR Circular 02/2000 (DETR, 2000).

Table 1.1 Assessment of risk to human health from land contamination. Key reports from DEFRA and the Environment Agency.

CLR7 *Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research* (DEFRA and Environment Agency, 2002a). CLR7 serves as an introduction to the other reports in this series. It sets out the legal framework, in particular the statutory definition of contaminated land under Part IIA of the Environmental Protection Act (EPA) 1990; the development and use of Soil Guideline Values; and references to related research.
CLR8 *Priority Contaminants for the Assessment of Land* (DEFRA and Environment Agency, 2002b). This identifies priority contaminants (or families of contaminants), selected on the basis that they are likely to be present on many current or former sites affected by industrial or waste management activity in the United Kingdom in sufficient concentrations to cause harm; and that they pose a risk, to either human health, buildings, water resources or ecosystems. It also indicates which contaminants are likely to be associated with particular industries.
CLR9 *Contaminants in Soil: Collation of Toxicological Data and Intake Values for Humans* (DEFRA and Environment Agency, 2002c). This report sets out the approach to the selection of tolerable daily intakes and Index Doses for contaminants to support the derivation of Soil Guideline Values.
CLR10 *The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms* (DEFRA and Environment Agency, 2002d). This report describes the conceptual exposure models for each standard land-use that are used to derive the Soil Guideline Values. It sets out the technical basis for modelling exposure and provides a comprehensive reference to all default parameters and algorithms used.
TOX 6 (DEFRA and Environment Agency, 2002e). This report details the derivation of the health criteria values for lead.
This document: SGV 10 *Soil Guideline Values for Lead Contamination.* This report presents the Soil Guideline Values for lead and sets out their derivation.

2 Developing Soil Guideline Values for lead

Occurrence and behaviour of lead in soil

2.1 Lead is a component of igneous rocks where it substitutes for calcium and potassium in the lattice of rock-forming minerals. Lead is known to have a strong chemical affinity for sulphur and readily forms sulphide ores such as galena, a widely distributed mineral common to many areas of hydrothermal mineralisation (Davies, 1995). Derived from the weathering of igneous rocks and mineralised areas, the most common sedimentary rocks including shales and mudstones have an average lead content of 23 mg kg^{-1} (Davies, 1995). In the UK, the highest regional concentrations of lead in soil occur in the central and northern Pennines, the Lake District, the Mendips and in a halo around London (Environment Agency, in preparation). A survey of soils in England and Wales reported a concentration ranging from 3 to 16,338 mg kg^{-1} with a median of 40 mg kg^{-1} (McGrath and Loveland, 1992).

2.2 The soil is a significant sink for anthropogenic lead, and there are several well-recognised major sources: mining and smelting activities; sewage sludge usage in agriculture; and aerial contamination from vehicle exhausts (Davies, 1995). It has been estimated that in Britain alone there has been in excess of 4000 km^2 of land affected by lead as a result of mining activity dating from Roman times or earlier (Thornton, 1998).[1] Historically, lead arsenate may have been applied to orchard trees to control pests (Merry *et al* 1983) and such soils may contain small amounts of lead residues.

2.3 Urban surveys of soils in Wolverhampton and Stoke reported lead concentrations that were significantly higher than the surrounding rural areas (Environment Agency, in preparation). In Wolverhampton the median concentration in the topsoil was found to be 158 mg kg^{-1}. The concentration of lead in the deeper soil profile was strongly correlated with the presence of made ground in known industrial areas and/or with sewage treatment works, rather than with the presence of major road junctions as was observed in London by Imperial College (Environment Agency, in preparation).

2.4 Estimated anthropogenic emissions of lead to the urban UK atmosphere have fallen substantially since the mid-1980s primarily as a result of the phasing out of lead in petrol (Thornton, 1998). AEA (1996) estimated that emissions of lead in petrol fell from 6555 tonnes in 1985 to 1295 tonnes in 1994. Air quality measurements in the city of Birmingham show a decline in air lead concentrations of around 90% over the period 1975 to 1992 (Thornton, 1998).

2.5 The main sources of lead in drinking water are lead service pipes and household plumbing, where solubility depends on water acidity, temperature and residence time.

2.6 Much work has been undertaken over the past twenty years to establish concentrations of lead in household dusts (Thornton, 1998). It is recognised that tracked-in or resuspended soil particles are a significant component of household dust (Paustenbach *et al*, 1997). Wang *et al* (1997) showed that lead concentrations in indoor and outdoor dust in Birmingham houses had fallen by as much as 50% over the period 1984 to 1996, although the concentration of lead in garden soils had fallen

[1] This includes areas where mine spoil has been eroded and redeposited, for example, in river valleys.

to a much lesser extent. It has been suggested that household dust may contribute around 50% of the total lead intake of a very young child (Paustenbach *et al*, 1997; Thornton, 1998).

2.7 Lead (Pb) is a member of Group IVB of the Periodic Table and, although both the oxidation states Pb(II) and Pb(IV) are stable, it is the former that is more important in its environmental behaviour (Davies, 1995). Lead is relatively immobile in soils and has been found to accumulate in the top horizons within the soil profile (Davies, 1995). Jopony and Young (1994) showed that the relationship between total soil lead content and soil solution lead concentration in soils from the Derbyshire mining area was a function of soil pH. Only a small proportion of the lead in soil is available for uptake by plants (Kabata-Pendias, 2001).

Potential for harm to human health and relevant health criteria values for soil

2.8 The principles behind the selection of health criteria values and the definition of concepts and terms used are outlined in CLR9 (DEFRA and Environment Agency, 2002c). Information on the toxicity of lead and reasons behind the selection of the most appropriate health criteria values for the derivation of this set of Soil Guideline Values are described in *Contaminants in Soil: Collation of Toxicological Data and Intake Values for Humans. Lead* (DEFRA and Environment Agency, 2002e). Reference to these documents is necessary to understand the information presented below.

2.9 The most significant health effect is the association of lead exposure with reduced cognitive development and intellectual performance in children. The developing foetus, infants and young children are the most critical receptors of concern.

2.10 Authoritative recommendations on tolerable intakes of lead are based on evaluation of the relationship between exposure and blood lead levels. Blood levels remain the standard index of exposure and of risk in humans, and are the most appropriate basis for the derivation of Soil Guideline Values for lead (DEFRA and Environment Agency, 2002e).

2.11 A blood lead concentration of 10 μg dL^{-1} (Table 2.1) appears to be the most appropriate one on which to base Soil Guideline Values for lead (see for example WHO, 1993, 2000a). This value is applicable to both adults and children, and should take account of exposure from all routes and from all sources (DEFRA and Environment Agency, 2002e). Expert groups generally consider there may be no threshold for the neurotoxic action of lead, and therefore the target concentration would be associated with the additional requirement that exposures from all sources should be as low as reasonably practicable.

Table 2.1 Health criteria value for lead in soil (see DEFRA and Environment Agency, 2002e)

Blood lead concentration (μg dL^{-1})
10

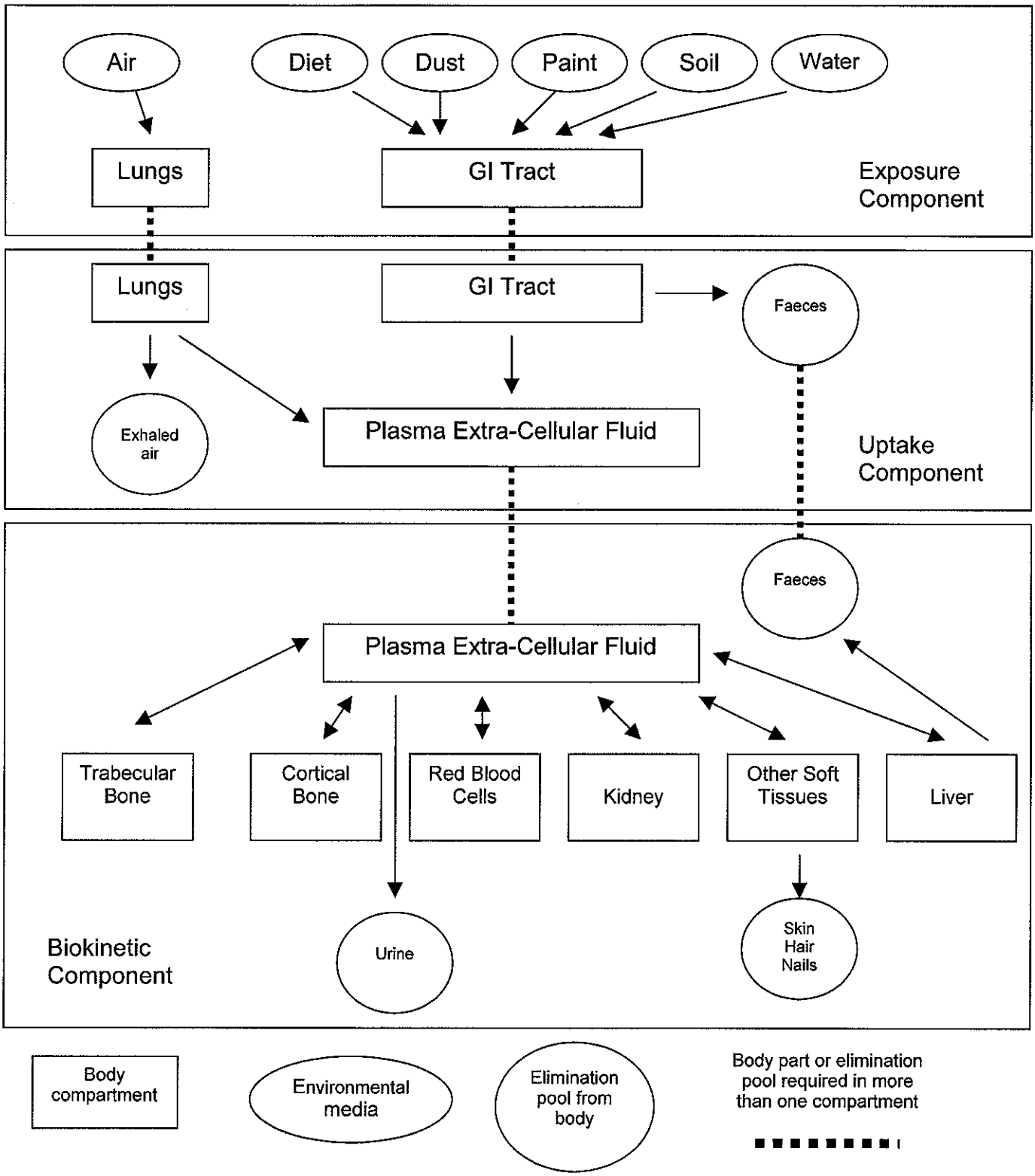
Modelling human exposure to lead in soil

2.12 In paragraph 2.10 the use of a health criteria value for lead based on an uptake dose was introduced. According to DEFRA and Environment Agency (2002c) the uptake dose is "the amount of a contaminant that reaches the circulating blood having been absorbed by the body through the skin, the gastrointestinal system and the pulmonary system". The CLEA model estimates exposure in terms of an intake dose rather than an uptake dose (see DEFRA and Environment Agency, 2002d). For lead, therefore, a different approach to estimating exposure is required in order to derive the Soil Guideline Values.

2.13 Over the past twenty years, the relationship between environmental exposure to lead and its impact on human health has been studied more than any other contaminant (Wixson and Davies, 1994). The amount of lead reaching the systemic circulation as a result of environmental exposure depends on many different factors (see Figure 2.1), including: the source of exposure; the efficiency of transfer across the lung or gut; pharmacokinetic partitioning throughout the body; and mechanisms of elimination (USEPA, 1994a). Because of the difficulties in predicting the uptake dose of lead by the body, early studies developed an empirical linear model relating environmental exposure (in terms of intake) to the observed blood lead concentrations in adults and children (SEGH, 1993; USEPA, 1994b, 1996a). The linearity of this empirical relationship has more recently been questioned, as several studies have demonstrated a non-linear relationship (Jin *et al*, 1997), especially at higher blood lead concentrations (USEPA, 1999a).

2.14 Although lead has been the subject of more work on understanding uptake than most, if not all, other contaminants, the ability to model the absorption and transport processes within the body are still limited. Variations in uptake between groups of individuals exposed to similar sources and levels of environmental lead are also likely to be high. Relatively complex models such as the Integrated Exposure Uptake Biokinetic for Lead in Children (IEUBK) Model (USEPA, 1999a, 2001a) are often empirically calibrated against small but detailed studies of the relationship between environmental exposure and uptake. It is often difficult to assess the tolerance of such models to changes in circumstances, and to apply them outside the boundaries of these experimental data sets is questionable (USEPA, 1994b).

Figure 2.1 Simple schematic of the biological processes involved in determining the concentration of lead in blood from environmental exposure (based on USEPA, 1994a)



2.15 There is at present no mechanism of relating estimates of environmental exposure to lead from the CLEA model to predictions of blood lead concentration in UK adults and children. The patterns of exposure used in CLEA are often quite different from those used in other countries such that it cannot be assumed that any calibration between exposure and blood lead concentration in other models would be reasonably applicable to the output from the CLEA model. Alternative approaches have therefore been adopted to derive Soil Guideline Values for lead.

Estimating childhood exposures to lead in soil

2.16 Recently the USEPA (1994a,b, 1999a, 2001a) has supported the development and use of the IEUBK Model as a site-specific tool for assessing the risk of elevated blood lead levels in children who might be exposed to lead from many sources including soil. It relates the concentrations in various environmental media to the body burden of lead in children exposed to these different sources in terms of a child's blood lead concentration.

2.17 The detailed approach to predicting the blood lead concentration of children in the IEUBK Model is not considered appropriate for deriving UK Soil Guideline Values for two reasons. Firstly, although the model has been used in the USA to provide a basis for estimating the risk of elevated blood lead for a hypothetical child exposure, there are concerns over its applicability at a regional level. The USEPA (1994b) commented in the original technical validation document that "...There is no empirical basis whatsoever for using the present version of the IEUBK model at this scale. We have serious concerns that large-scale input data may be totally inadequate characterisations of the spatially confined exposures for any individual child." Secondly, and perhaps more importantly, the applicability of the exposure model and its calibration to uptake of lead has not been validated under UK conditions. Further work is clearly needed to check that the underlying model is applicable/adaptable to UK factors such as differences in diet, population physiology, land-use patterns and patterns of non-soil-related exposure.

2.18 This report accepts these concerns. Accordingly, Soil Guideline Values that are protective of the health of children have been derived in this report using the approach recommended by a task force working under the auspices of the Society for Environmental Geochemistry and Health (SEGH, 1993). The task force comprised many experts on environmental lead and health, including three leading UK authorities. The SEGH approach is discussed in more detail in paragraphs 2.20 to 2.23.

2.19 It is recognised that a linear model for the relationship between blood lead in children and its concentration in different environmental media, such as that used by SEGH (1993), has been questioned by some commentators (USEPA, 1994b, 1999a). However, there is as yet no practical alternative to this approach for the development of UK generic assessment criteria. USEPA (1994b) notes that "...Theoretically, in situations where the child has constant long-term or chronic levels of exposure, both the slope factor approach and the UBK [now IEUBK] model should produce similar results when sufficient data exist to correctly characterise lead exposure absorption and biokinetics."

2.20 The model developed by SEGH (1993) may be used to generate a Soil Guideline Value which depends on:

- the target blood lead concentration and the degree of compliance within the overall population (see paragraph 2.11),
- the blood lead attributable to sources other than on-site soil exposure,
- the slope of the empirical relationship between blood lead concentration and soil lead concentration (δ).

The SEGH model is shown in Equation (2.1). The default values used to derive Soil Guideline Values are presented in Table 2.2, and factors in their selection are discussed in the following paragraphs.

Equation 2.1

$$S = \left(\frac{\frac{T}{G^n} - B}{\delta} \right) \times 1000$$

where S is the soil or dust guideline ($\mu g\ g^{-1}$ or $mg\ kg^{-1}$)
T is the blood lead target concentration ($\mu g\ dL^{-1}$)
G is the geometric standard deviation of the blood lead distribution
B is the background or baseline blood lead concentration in the population from sources other than soil and dust ($\mu g\ dL^{-1}$)
n is the number of standard deviations corresponding to the degree of protection required for the population at risk
δ is the slope or response of the blood lead versus soil and dust lead relationship ($\mu g\ dL^{-1}$ blood increase per 1000 $\mu g\ g^{-1}$ increment of soil or dust lead)

2.21 One of the main uncertainties in the SEGH model is the choice of δ (delta), which is the response of blood lead *in children* to increasing soil or dust lead concentration. Because δ is based only on empirical studies of environmental lead exposure and blood lead concentrations in children, it is not appropriate for adults (see paragraphs 2.25 to 2.29 for an approach applicable to adults).

2.22 There have been a number of studies that have examined the empirical relationship between environmental lead exposure and the blood lead concentration in children, and the range of slopes reported is wide, from 0.9 to 9.0 $\mu g\ dL^{-1}$ per 1000 $\mu g\ g^{-1}$ (SEGH, 1993). Because of differences in design, sources and patterns of exposure, the studies are not readily comparable. Some of the children studied were obviously exposed from multiple sources, and few of the studies measured all of the major sources of exposure either for individuals or adequately for the groups investigated. The age range of children was large, from less than 1 to 18 years of age, and widely differing environments were studied – smelter and battery plant exposure, old mining districts and urban areas.

2.23 SEGH (1993) considered that the reasonable range of δ values was 2–5 $\mu g\ dL^{-1}$ per 1000 $\mu g\ g^{-1}$, but that this value should be adjusted in light of particular knowledge about a given situation.[2] Low values of δ tend to relate to groups with: (1) older children; (2) well-maintained vegetative cover; (3) mining contamination (low bioavailability); (4) cleaner homes and more frequent hand washing; or (5) heavier textured soils. Conversely, higher values of δ tend to be found in groups with: (1) children likely to exhibit peak exposure between 18 and 24 months; (2) dusty conditions, sparse vegetative cover; (3) homes with poor cleanliness and infrequent hand washing; (4) soil lead sources with slightly soluble lead salts such as that derived from automotive or stack emissions or well-oxidised and more soluble sources including exterior paint; or (5) light textured or low organic matter soils. The default value used to derive Soil Guideline Values is 5 $\mu g\ dL^{-1}$ per 1000 $\mu g\ g^{-1}$, which represents the highest value in the reasonable range reported by SEGH (1993) and is the arithmetic average of studies cited by Duggan and Inskip (1985).

2.24 The background exposure to lead from non-soil sources is another important parameter in the SEGH model. Although it is tentatively possible to calculate a mean daily intake (MDI) for UK children from non-soil sources of lead such as food, water and air (DEFRA and Environment Agency, 2002e; Thornton, 1998), this exposure cannot readily be related to the baseline blood lead concentration. The most recent national survey of blood lead in children (the ALSPAC study) did not look at controlled exposure, that is, groups that might be isolated from different sources of lead exposure such as soil/dust (Golding *et al*, 1998). Therefore, it is undoubtedly the case that the background blood lead concentration used in the derivation of the Soil Guideline Values (see Table 2.2) includes a component attributable to soil and soil-derived indoor dust, and that the Soil Guideline Values overestimate the contribution from soil sources through this double-counting.

Table 2.2 Default values used in the SEGH model (SEGH, 1993) to derive Soil Guideline Values

Parameter	Value	Notes
T	10 $\mu g\ dL^{-1}$	Health criteria value (DEFRA and Environment Agency, 2002e)
G	1.4	Typically lies in the range 1.3 to 1.5, but it may be higher for groups exposed to multiple and heterogeneous sources (SEGH, 1993)
B	3.44 $\mu g\ dL^{-1}$	Geometric mean of blood lead concentrations in young children observed as part of the UK ALSPAC study (Golding *et al*, 1998)
n	1.645	Chosen on the basis of the degree of protection needed for a population at risk at the target concentration (T); default value is 95%.
δ	5 $\mu g\ dL^{-1}$ per 1000 $\mu g\ g^{-1}$	Critical variable derived from observed empirical relationship between blood lead concentrations in children and exposure to soil and non-soil sources (SEGH, 1993); see discussion in paragraphs 2.21 to 2.23.

[2] That is, a 1000 $\mu g\ g^{-1}$ increase in soil lead results in an increase of 2–5 $\mu g\ dL^{-1}$ blood lead in children.

Estimating adult exposures to lead in soil

2.25 As discussed previously, the relationship between environmental exposure to lead and blood lead concentration is normally described empirically on the basis of observed studies that take into account differing adult and child characteristics, exposure patterns (often related to land-use) and sources of contamination. The δ value used in the SEGH model relates to child exposures in a residential setting (see paragraph 2.21) and is therefore inappropriate for considering adult exposures in a commercial/industrial setting. The Soil Guideline Values for this land-use have therefore been derived using an adaptation of the adult lead model developed by the USEPA Technical Review Workgroup for Lead (USEPA, 1996a).

2.26 While other health effects of lead exposure have been reported, such as hypertension (DEFRA and Environment Agency, 2002e), the critical health effect of lead relates to the impairment of mental and behavioural development in young children (see paragraph 2.9)[3]. The objective of the model is to assess whether adult exposure to lead contamination in soil at a non-residential site is likely to exceed the target blood lead concentration in women of childbearing age and consequently exceed the target blood lead concentration in a developing foetus. Although described as an interim approach in 1996, the original model is still supported by the USEPA (2001b) in the context of developing guidelines for considering adult exposures in a non-residential setting.

2.27 A key assumption of the model is that blood lead concentrations for exposed adults can be estimated as the sum of an expected starting blood lead concentration in the absence of site exposure and an expected site-related increase. The adult exposure model (USEPA, 1996a) relates environmental lead exposure to adult blood lead concentrations using a linear slope approximation, the Biokinetic Slope Factor (BKSF). The BKSF itself is derived empirically from a study by Pocock *et al* (1983) of the relationship between lead in tap water and in the blood of adult males. The model assumes that the dominant route of exposure in adult workers is from direct soil ingestion and that exposure to lead can be related to uptake of lead using an empirical absorption factor. It uses a log-normal model to estimate the inter-individual variability in blood concentrations (that is, the distribution of blood lead concentrations in a population of individuals who are exposed to similar environmental lead levels).

2.28 The original model assumes that expected foetal blood lead concentrations are proportional to maternal blood lead concentrations (Goyer, 1990; Graziano *et al*, 1990). The default assumption is that the foetal blood lead concentration is 90% of the maternal blood lead concentration (USEPA, 1996a). Thus, the model shown in Equation (2.2), which is an adaptation of the USEPA approach relating to a target maternal blood lead concentration of 10 μg dL^{-1}, is also protective of the foetus.

2.29 The default values used for deriving the Soil Guideline Value are presented in Table 2.3. Note that the background adult blood lead concentration, taken from the 1995 survey of England (Primatesta *et al*, 1998), almost certainly includes urban exposures via soil and dust, and therefore there is a proportion of double-counting. However, this effect is probably less than observed with the baseline concentration used in the SEGH model, since the adult model includes off-site soil sources in its baseline level.

[3] It should be noted that the health criteria value for lead in Table 2.1 should be applied to both adults and children (see paragraph 2.11)

Equation 2.2

$$S = \left(\frac{T}{G^n} - B \right) \times \left(\frac{AT}{BKSF \times IR \times AF \times EF \times ED} \right)$$

where S is the soil or dust guideline ($\mu g\ g^{-1}$ or $mg\ kg^{-1}$)
T is the blood lead target concentration among mothers exposed to the specified site soil lead concentrations ($\mu g\ dL^{-1}$)
G is the geometric standard deviation of the blood lead distribution among adults having exposures similar to on-site lead concentrations but having a non-uniform response to site lead and non-uniform off-site lead exposures
B is the background or baseline blood lead concentration in women of childbearing age in the absence of exposures to the site that is being assessed ($\mu g\ dL^{-1}$)
n is the number of standard deviations corresponding to the degree of protection required for the population at risk
AT is the averaging time in days
BKSF is the biokinetic slope factor relating (quasi-steady-state) increase in typical blood lead concentration to average daily lead uptake ($\mu g\ dL^{-1}$ blood lead increase per $\mu g\ day^{-1}$ lead uptake)
IR is the daily adult soil ingestion rate including outdoor soil and indoor soil-derived dust ($g\ day^{-1}$)
AF is the absolute gastrointestinal absorption factor for ingested lead in soil and lead in dust derived from soil (dimensionless)
EF is the exposure frequency for contact with contaminated soils and/or dust ($day\ yr^{-1}$)
ED is the exposure duration (yr)

Table 2.3 Default values used in the adult exposure model (USEPA, 1996a) to derive Soil Guideline Values

Parameter	Value	Notes
T	10 $\mu g\ dL^{-1}$	Health criteria value (DEFRA and Environment Agency, 2002e)
G	2.0	Typically lies in the range 1.8 to 2.1 but it may be higher for groups exposed to multiple and heterogeneous sources (USEPA, 1996a)
B	2.3 $\mu g\ dL^{-1}$	Average of the geometric mean of blood lead concentrations found in UK women aged 16–44 in an urban region in 1995 (Primatesta *et al*, 1998)
n	1.645	Chosen on the basis of the degree of protection needed for a population at risk at the target concentration (T); default value is 95%
AT	15695 day	Averaging time assumed for exposure over a working life time of 43 years. Based on the default exposure model for the commercial/ industrial land-use in CLEA (DEFRA and Environment Agency, 2002d)
BKSF	0.4 $\mu g\ dL^{-1}$ per $\mu g\ day^{-1}$	Factor proposed by USEPA (1996a) from underlying work by Pocock *et al* (1983) and Sherlock *et al* (1982, 1984)
IR	0.04 $g\ day^{-1}$	Based on default exposure model for the commercial/industrial land-use in CLEA (DEFRA and Environment Agency, 2002d)
AF	0.12	Based on an absorption factor for soluble lead of 0.2 and a relative bioavailability of 0.6 (soil/soluble) from USEPA (1996a)
EF	230 $day\ yr^{-1}$	Based on default exposure model for the commercial/industrial land-use in CLEA (DEFRA and Environment Agency, 2002d)
ED	43 yr	Based on default exposure model for the commercial/industrial land-use in CLEA (DEFRA and Environment Agency, 2002d)

3 Soil Guideline Values for Lead

Purpose

3.1 Soil Guideline Values are a screening tool for use in the assessment of land affected by contamination. They can be used to assess the risks posed to human health from exposure to soil contamination in relation to land-use. They represent "intervention values", indicators to an assessor that soil concentrations above this level might present an unacceptable risk to the health of site-users and that further investigation and/or remediation is required. Further information on applying Soil Guideline Values in the regulatory context, including Part IIA of EPA 1990, can be found in CLR7 *Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research* (DEFRA and Environment Agency, 2002a).

3.2 Soil Guideline Values have been developed on the basis of many critical assumptions about possible exposure to soil contamination. It is important that an assessor understands these assumptions and limitations before applying Soil Guideline Values to an area of land. See paragraphs 2.12 to 2.27 for further information. It should be noted that the approach to setting Soil Guideline Values for lead does not take into account the detailed conceptual models described in CLR10 (DEFRA and Environment Agency, 2002d). However, the Soil Guideline Values have been set for different land-uses (see Table 3.1) on the basis of whether a child or adult is considered to be the critical receptor.

Table 3.1 A brief description of the standard land-uses for Soil Guideline Values

Residential People live in a wide variety of dwellings including, for example, detached, semi-detached and terraced property up to two storeys high. This land-use takes into account several different house designs including buildings based on suspended floors and ground-bearing slabs. It assumes that residents have private gardens and/or access to community open space close to the home. Exposure has been estimated with and without a contribution from eating homegrown vegetables, which represents the key difference in potential exposure to contamination between those living in a house with a garden and those living in a house where no private garden area is available.
Allotments Provision of open space, commonly made by the local authority, for local people to grow fruit and vegetables for their own consumption. Typically, each plot is about a one-fortieth of a hectare with several plots to a site. Although some allotment holders may choose to keep animals, including rabbits, hens and ducks, potential exposure to contaminated meat and eggs has not been considered.
Commercial/industrial There are many different kinds of workplace and work-related activities. This land-use assumes that work takes place in a permanent single-storey building, factory, or warehouse where employees spend most time indoors involved in office-based or relatively light physical work. This land-use is not designed to consider those sites involving 100% hard cover (such as car parks) where the risks to the site-user are from ingestion or skin contact because of the implausibility of such exposures arising while the constructed surface remains intact. Further guidance on the limitations in applying this land-use to different industries can be found in DEFRA and Environment Agency (2002d).

3.3 If used correctly, an exceedance of a Soil Guideline Value can indicate a potentially significant risk to human health. However, this does not necessarily imply that there is an actual risk to health, and the assessor should take into account site-specific circumstances. Furthermore, if incorrectly applied to a site where the critical pathway or chemical form of the contaminant is not one that has currently been evaluated, a potentially significant risk might be present even though a Soil Guideline Value is not exceeded. So it is important that a risk assessor uses Soil Guideline Values as a component of an overall risk assessment and management strategy for a site in accordance with good practice (DEFRA and Environment Agency, in preparation; DETR, Environment Agency and IEH, 2000) and, in particular, an appropriate sampling and testing strategy (DEFRA and Environment Agency, 2002a).

Soil Guideline Values according to land-use

3.4 The Soil Guideline Values for lead contamination are summarised in Table 3.2. For residential and allotment land-uses, the Soil Guideline Values are set to be protective of young children using the SEGH model (SEGH, 1993) because in general they are more likely to have higher exposures to soil contaminants. For the commercial/industrial land-use, an adult is assumed to be the critical receptor and therefore the adapted USEPA model (USEPA, 1996a) is used with exposure considered over the working lifetime.

3.5 The Soil Guideline Value is the concentration at which predicted exposure is unlikely to exceed the blood lead target concentration taking into account patterns of exposure for different land-uses. In the case of the child model (SEGH, 1993) this is expressed in the choice of δ, and in the adult model (USEPA, 1996a) by the soil ingestion rate, the absorption factor, the biokinetic slope factor and the likely frequency and duration of exposure.

3.6 Both the SEGH (1993) and the USEPA (1996a) take into account the inter-individual variability in blood lead concentrations in a population. That is, across a population with similar exposures to lead in soil, the uptake and ultimately the concentration in systemic circulation will vary between individuals. In applying either of these models it is therefore necessary to take this variability into account and to make a judgement as to the proportion of variability that will be at or below the target blood lead concentration. For example, in deriving revised guidelines, WHO (2000b) set an objective in relation to air quality that 98% of the general population would have a blood lead concentration of less than 10 μg dL^{-1}, in which case the median blood lead value would not be more than 5.4 μg dL^{-1}. In deriving Soil Guideline Values an objective of 95% has been set (n = 1.645 in Tables 2.2 and 2.3). That is, there is a 95% likelihood that an adult or child exposed to lead in soil at the Soil Guideline Value (taking into account the source and pattern of exposure implicit in each model) will have a blood lead concentration less than the health criteria value. Because of the conservative assumptions explicit in both the SEGH and adapted USEPA models, and the degree of double-counting in the choice of baseline blood lead concentrations, this does *not* mean that the Soil Guideline Value is only protective of 95% of the general UK population. The final Soil Guideline Values reported in Table 3.2 have been rounded to the nearest one or two significant figures.

Table 3.2 Soil Guideline Values for lead as a function of land-use

Standard land-use	Soil Guideline Value (mg kg^{-1} dry weight soil)
Residential with/without plant uptake	450
Allotments	
Commercial/industrial	750

Notes
1. Based on total lead concentration in the soil.
2. Values apply to the geometric mean of soil concentration across a site.
3. Based on the SEGH (1993) model.
4. Based on a modified USEPA (1996) model.

Further information for assessors applying these Soil Guideline Values

3.7 In applying the Soil Guideline Values in this report to a contaminated site, assessors will find the advice presented in the following paragraphs useful. It is good practice for risk assessors to accompany their risk assessment with an appropriate risk evaluation, including a clear statement of whether or not representative soil concentrations from the site exceed any generic or site-specific assessment criteria (DEFRA and Environment Agency, in preparation; DETR, Environment Agency and IEH, 2000). In using Soil Guideline Values it is essential that the assessor reviews the wider context as discussed in CLR7 (DEFRA and Environment Agency, 2002a).

3.8 The assessor is referred to TOX 6 (DEFRA and Environment Agency, 2002e) for a detailed explanation of the derivation of the health criteria values used in this report, and the attendant uncertainties. This is important, especially when considering the significance of any exceedance of a Soil Guideline Value.

3.9 The Soil Guideline Values are sensitive to the empirical relationship between environmental lead exposure and blood lead concentration in adults (USEPA, 1996a) and children (SEGH, 1993). In particular, paragraphs 2.21 to 2.23 discuss the uncertainty in the choice of δ in the SEGH model. It is strongly recommended that the δ value is not changed without a detailed consideration and investigation of exposure patterns, the source of lead emissions and its relative bioavailability, and where possible measured concentrations of blood lead. It is important to note that the physico-chemical characteristics of the soil–lead matrix are not the sole determinants of lead bioavailability in the highly complex biological process of gastrointestinal absorption (USEPA, 1999b).

Table 3.3 Contribution to total exposure from soil for the relevant pathways expressed as a percentage of the mean exposure calculated by the CLEA model

Exposure pathway	Contribution to exposure from soil according to land-use (%)		
	Residential with plant uptake and allotments	Residential without plant uptake	Commercial /industrial
Ingestion of soil and indoor dust	71	100	100
Consumption of homegrown vegetables	22	–	–
Ingestion of soil attached to vegetables	7	–	–
Inhalation of soil and indoor dust	<0.1	<0.1	<0.1

Notes

1. Note that the CLEA model was not used to derive the Soil Guideline Values for lead and this table is intended only to illustrate the most likely exposure routes for soil contamination in different land-use settings.
2. "–" indicates that this pathway is not included in the conceptual model for the standard land-use.

3.10 Although the Soil Guideline Values have not been derived using the CLEA model, assessors may find it useful to refer to Table 3.3, which illustrates the likely exposure pathways according to land-use. It is important to note that the estimated pattern of exposure from the CLEA model is not necessarily equivalent to the circumstances observed in the empirical studies on which δ was based (SEGH, 1993) and does not relate to uptake. The table is intended to be used only for the purpose of evaluating and targeting the need for further risk assessment and/or risk management.

3.11 According to the CLEA model, the dominant exposure pathway is likely to be the direct ingestion of soil and soil-derived indoor dust (see Table 3.3). The uncertainties in modelling exposure via this pathway are discussed in CLR10 (DEFRA and Environment Agency, 2002d). The consumption of homegrown vegetables may contribute up to 30% of soil exposure in the standard residential and allotment land-uses. Where it is likely that the consumption of homegrown vegetables contributes to overall exposure, it is strongly recommended that, where possible to do so, the availability of lead to plants should be determined on a site-specific basis, and further investigation (including the sampling of fruits and vegetables) is suggested.

3.12 Inhalation of soil-derived dusts normally contributes less than 1% of total exposure for each of the standard land-uses described in Table 3.3. However, in undertaking a site assessment, the assessor should always consider the possibility that inhalation of dust may be a more important exposure pathway.

Comparison with other approaches

3.13 It is essential that any comparison between the Soil Guideline Values presented in this report and other approaches, including quantitative criteria, should be informed by reference to the conceptual models behind each set of guidelines and taking into account the context in which they are intended

to apply. There are a number of reasons why the generic assessment criteria developed in one country may differ from those found in another.

3.14 It is not easy to transpose technical guidance from one jurisdiction to another and to make comparisons between the various quantitative levels set. Such guideline values may have been developed in a different management context, depending on legislation and policy, with different overall objectives.[4] There may be subtle but significant differences between the conceptual exposure models that take into account the different ways that people behave between countries and differences in site conditions such as soil pH, soil type and depth to water table. The characterisation of the critical human receptor may also be quite different, and this can have a major impact on the guidelines derived.

3.15 The Interdepartmental Committee for the Redevelopment of Contaminated Land (ICRCL) published trigger concentrations for lead (ICRCL, 1987). The threshold concentration for lead for "domestic gardens and allotments" is 500 mg kg^{-1} and that for "parks, playing fields and open space" is 2000 mg kg^{-1}. No action values were published. There is little information available about the conceptual models that are implicit in these values, although direct soil ingestion and plant uptake are specifically mentioned. It is therefore difficult to compare these values further with the new Soil Guideline Values.

3.16 A comparison of the Soil Guideline Values with generic assessment criteria in other countries shows that they lie within a similar range. In some cases this is fortuitous, in others the result of taking a broadly similar approach. As the SGVs presented in this report have been derived by an approach other than the CLEA model, it is not possible to estimate the variation in values that might result by using the major assumptions dominating the values used in other countries.

3.17 The current Dutch integrated Intervention Value (IV) for lead and all land-uses is 530 mg kg^{-1} (RIVM, 1994). This appears to be based on pragmatic considerations, since this value is higher than either the human health IV, which is 300 mg kg^{-1}, or the ecotoxicity IV, which is 290 mg kg^{-1}. Pathways included in the human health IV include direct ingestion of soil, consumption of crops and inhalation of soil-derived dust. The IV is derived using a conventional tolerable daily intake, rather than an approach directly based on the effect on blood lead concentrations. However, the TDI used is 3.6 μg kg^{-1} bw day^{-1}, which approximates to the WHO provisional tolerable weekly intake (PTWI) of 25 μg kg^{-1} bw $week^{-1}$. As discussed in DEFRA and Environment Agency (2002e), this PTWI considers the effect on the blood lead of a child. Further, in recognition that the critical receptor is the child, exposure and averaging is only conducted over the first six years of life, rather than a lifetime. A bioavailability factor of 1 for soil lead uptake by the body is used. Adjusting for the default soil type used in CLEA (15% clay and 2% soil organic matter), the human health IV would reduce to approximately 235 mg kg^{-1}.

3.18 It is likely that the Dutch Intervention Values will soon be changing (RIVM, 2001). The new guidelines are termed "serious risk concentrations" (SRC) and the proposed integrated SRC for lead is 580 mg kg^{-1}. This is based on considerations of ecotoxicity, since the proposed human health SRC is 622 mg kg^{-1}. The approach used to derive the new Dutch values remains the same in relation to the TDI and exposure and averaging period. The proposed bioavailability factor has been lowered

[4] Such objectives might include as intervention values or as remediation standards to be applied to different current and future uses.

to 0.6. Thus the difference between the human health IV and proposed human health SRC appears to be due to changes in bioavailability, and the exposure factors and algorithms used.

3.19 The USEPA Soil Screening Level (SSL) for lead is 400 mg kg^{-1} (USEPA, 1996b). The SSLs were developed to "help standardise and accelerate the evaluation and cleanup of contaminated soils at sites on the National Priorities List (NPL) with anticipated future residential land use scenarios". There is a footnote for the SSL for lead, which states that the figure was taken from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (USEPA, 1994c). This report explains that this figure was derived by setting up a reasonable worst-case scenario in the Integrated Exposure Uptake Biokinetic (IEUBK) Model (discussed above) used in the USA for site-specific risk assessment. However, it should be noted that a later "clarification" of this directive (USEPA, 1998) does not mention any quantitative criterion but puts the emphasis firmly on the use of the IEUBK Model for an "individual child or group of similarly exposed children".

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