SITE CHARACTERIZATION/REMEDIAL INVESTIGATION REPORT AREA OF INTEREST 4

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PHILADELPHIA ENERGY SOLUTIONS FACILITY
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October 16, 2013
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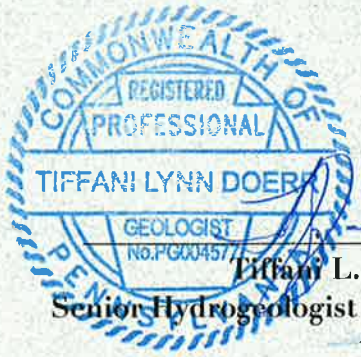

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1.0 INTRODUCTION

This Site Characterization Report/Remedial Investigation Report (SCR/RIR) has been prepared for Area of Interest (AOI) 4 at the Philadelphia Energy Solutions Refining and Marketing LLC (PES) refinery (facility). Sunoco Inc. (R&M) (Sunoco) sold the site, with the exception of Belmont Terminal, to PES under a Buyer Seller Agreement signed by Sunoco, PES and the Pennsylvania Department of Environmental Protection (PADEP) in September 2012. Sunoco Logistics Partners is the current owner of Belmont Terminal.

Site remediation at the facility is ongoing as part of previously-established programs and the 2012 Buyer Seller Agreement described below. The facility has operated, and is planned to continue operating, as a refinery.

Regulatory Overview

Sunoco and the PADEP entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to the facility. Sunoco's Phase I Remedial Plan (Phase I Plan), dated November 2003, was included as an attachment to the CO&A. In accordance with the CO&A and Phase I Plan, a Current Conditions Report and Comprehensive Remedial Plan (CCR) was prepared by Sunoco in June 2004. The Phase I Plan and the CCR divided the facility into 11 AOIs, and presented a prioritization of the AOIs based on specific risk factors. The CCR also presented the Phase II remedial approach and schedule to characterize each of the 11 AOIs, and to conduct Phase I and II corrective action activities in accordance with the 2003 CO&A and the Phase I Plan. Since 2003, Sunoco has completed site characterization activities at all eleven AOIs in accordance with the 2003 CO&A. For each AOI that has been characterized, Sunoco prepared and submitted a corresponding SCR in accordance with the Revised Phase II Corrective Action Activities schedule (as amended) that was included in the CCR.

With regard to AOI 4, Sunoco prepared a Site Characterization Work Plan (Work Plan) for AOIs 1 and 4 in January 2005 which was approved by the PADEP in March 2005. This Work Plan summarized proposed activities to be completed to characterize AOIs 1 and 4 in accordance with the objectives of the CCR. The Work Plan was implemented between April and May 2005 and the results were summarized in the SCR that was submitted to PADEP and the United States Environmental Protection Agency (EPA) on August 29, 2005 (Sunoco, 2005).

In October 2006, Sunoco submitted a notice of intent to remediate (NIR) to the PADEP for the facility, entering the facility into the Act 2 program. On November 2011, the facility was formerly entered into the PA One Cleanup Program between the EPA – Region III and PADEP. Sunoco submitted a revised *Work Plan for Sitewide Approach Under the One Cleanup Program* (Work Plan for Sitewide Approach) to document the Sitewide remedial approach extending beyond the requirements of the 2003 CO&A. In accordance with the Work Plan for Sitewide Approach, Sunoco is preparing "repackaged" SCR/RIRs to formerly satisfy the requirements of Act 2.

This report is the repackaged SCR/RIR for AOI 4 and describes site characterization work included in the 2005 AOI 4 SCR, as well as site characterization work completed in 2013 to supplement the 2005 work. The supplemental work was completed to characterize deeper soils (2-15 feet interval) and to address regulated storage tank compliance issues for certain tanks in AOI 4. To further evaluate groundwater conditions, a comprehensive round of groundwater gauging and sampling was also conducted from the network of monitoring wells in AOI 4.

In accordance with Act 2, Langan Engineering and Environmental Services, Inc. (Langan), on behalf of Sunoco, has prepared the required public and municipal notices as part of this report submittal. Appendix A includes a copy of the facility NIR, as well as the Act 2 report notices and their proof of receipt/publication for this report.

1.1 Facility Description

The facility is located in southwest Philadelphia. AOI 4 also known as #4 Tank Farm Area, is bordered by Hartranft Street to the north, 26th Street to the east, Penrose Avenue to the south, and AOI 3 to the west (Figures 1 and 2) and encompasses approximately 105 acres.

1.2 Facility Operational History and Current Use

The facility is located in southwest Philadelphia and has a long history of petroleum transportation, storage, and processing. The oldest portion of the facility started petroleum-related activities in the 1860s when the Atlantic Refining Company established an oil distribution center. In the 1900s, crude oil processing began and full-

scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals such as acids and ammonia were also produced at the facility.

Historically, it was noted that the area was originally used for farming. Currently, AOI 4 is primarily occupied by crude oil and gasoil aboveground storage tanks (ASTs). Numerous below ground pipelines are active within AOI 4; this is the largest storage area in the facility. Several pump houses are also present in AOI 4. As shown in Figure 2, roads and tank berms throughout the AOI are covered by surfaces which prevent direct contact with site soils.

The existing groundwater monitoring well network in AOI 4 includes a total of 47 shallow monitoring points: 15 shallow monitoring wells, 13 shallow/intermediate monitoring wells, one piezometer, and 19 recovery wells. Twelve of the 13 shallow/intermediate monitoring wells were installed in 2013 to further characterize light non-aqueous phase liquids (LNAPL) occurrence and groundwater conditions. A well construction summary of AOI 4 monitoring points is included as Table 1. The existing monitoring well network is illustrated on Figure 3. Groundwater gauging of select monitoring wells in AOI 4 occurs on an annual basis during the second quarter of each year by Stantec Consulting Corporation (Stantec). Annual gauging activities and results are reported to the PADEP and EPA in Quarterly Reports prepared by Stantec on behalf of Sunoco. The Quarterly Reports also include the results of Sunoco's annual perimeter monitoring well sampling program.

During 2012 and 2013, Sunoco installed a total fluids recovery system along the border of Penrose Avenue, near the intersection of 26th Street, at the southern end of AOI 4. This system consists of 16 recovery wells arranged in two arrays running parallel to Penrose Avenue as illustrated in Figure 3. The first array of 11 recovery wells runs along Avenue G and the second array of 5 recovery wells runs 150 feet north in the same orientation. The system has the capability of pumping total fluids from recovery wells RW-700 through RW-717. The recovered water/LNAPL mixture is transferred to a nearby treatment trailer for separation of LNAPL from water. Recovered LNAPL is collected in a tank and is removed by a vacuum truck and transported within the refinery for reuse. Recovered water is discharged to the Philadelphia Water Department (PWD) sanitary sewer in accordance with the PWD discharge permit issued March 15, 2010,

which will expire on March 15, 2015. This system was brought online in March of 2013 and is described further in Section 6.1 of this report.

Four other recovery wells are located in AOI 4. These four recovery wells are part of two separate recovery systems. The S-30 Recovery System only includes recovery well S-30. The S-36 Recovery System includes recovery wells S-34, S-35 and S-36. Due to lack of recoverable product, both systems were taken offline in 2010 and have remained offline.

1.3 Selection of Constituents of Concern and Applicable Standards

The constituents of concern (COCs) for soil and groundwater in AOI 4 are listed in Table 2 of this report. The COCs for the completed activities include all current constituents from the Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E of PADEP's Closure Requirements for Underground Storage Tank Systems, with the exception of the waste oil parameters since waste oil is only stored in small tanks within the facility maintenance garages. In May 2009, two additional COCs, 1,2,4-trimethylbenze (1,2,4-TMB) and 1,3,5-trimethylbenzene (1,3,5-TMB), were added to the list of COCs by Sunoco based on the PADEP's revisions to the petroleum short list of compounds and at the request of the PADEP. The COC listing for groundwater was also revised in 2012 to follow the soil COC listing. The additional compounds added to the groundwater COC list included anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, and benzo(b)fluoranthene.

<u>Media of Concern</u>

The media of concern for AOI 4 include groundwater and soil. The potential vapor intrusion into indoor air exposure pathway was evaluated by completing a site-specific indoor air evaluation.

<u>Act 2 Remediation Standards</u>

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

Groundwater

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

Shallow Soil – 0 to 2 Feet Interval

Shallow (0-2 feet) soil samples were collected at each soil boring/monitoring well location that represents a potentially complete direct contact exposure pathway to facility workers (at unpaved areas). These shallow soil results were screened against the PADEP non-residential soil MSCs. Where constituent concentrations are above the PADEP non-residential soil MSCs, Sunoco evaluated application of the site-specific remediation standard using either the pathway elimination or calculated risk-based standard options.

Soil – 2 to 15 Feet Interval

Deep (2-15 feet) soil samples were collected at several locations to either vertically delineate shallow soil exceedances or to characterize deep soils where only a shallow sample was previously collected. These deep soil results were screened against the PADEP non-residential soil MSCs. Where constituent concentrations are above the PADEP non-residential soil MSCs, Sunoco evaluated application of the site-specific remediation standard using either the pathway elimination or calculated risk-based standard options.

Potential Vapor Intrusion Into Indoor Air

In October 2012, Stantec completed an indoor air assessment at the facility that included sampling indoor air in occupied buildings at the facility that are not under positive pressure. To evaluate the potential vapor intrusion into indoor air exposure pathway, the results of this assessment were screened against the Occupational Safety and Health Association (OSHA) Permissible Exposure Limits (PELs) since PES considers these buildings regulated by OSHA.

2.0 ENVIRONMENTAL SETTING

AOI 4 is located in the central portion of the refinery commonly referred to as the #4 Tank Farm Area. AOI 4 is bordered by Hartranft Street to the north, 26th Street to the east, Penrose Avenue to the South, and AOI 3 to the west (Figures 1 and 2). AOI 4 encompasses approximately 105 acres.

2.1 Geology

The geology at AOI 4 has been extensively studied and described in the 2003 CCR and the 2005 AOI 4 SCR. To illustrate the geology at AOI 4, geologic cross section P-P,' trending north to south, was prepared using historic and recent 2013 subsurface information. The cross section location is shown in Figure 4 and the cross section is included as Figure 5.

The following paragraphs describe the geologic units encountered during Site characterization activities in AOI 4 beginning with the deepest units to the shallowest units:

Wissahickon Formation – Bedrock beneath AOI 4 is identified as the Wissahickon Schist. This formation beneath AOI 4 is a metamorphosed greenish-gray micaceous schist and quartzite. In most areas of AOI 4, the competent bedrock of the Wissahickon Formation is overlain by weathered bedrock consisting of a micaceous clay, which becomes increasingly sandy as the degree of weathering lessens and competent bedrock is encountered.

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 System. The Lower Sand beneath AOI 4 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 4, the Lower Sand is overlain by the Middle/Lower Clay, as indicated by borings S-59D, S-38D, and S-119D. Sunoco submitted an Act 2 Final Report for AOI 11, which is the Lower Sand Unit beneath the facility, in June 2013.

Middle/Lower Clay – The Lower Sand is overlain by the Middle/Lower Clay unit. The Middle/Lower Clay is characterized by very low permeability reddish-brown, brown or gray clays, and may be sandy in places (Paulachok, 1991).

Trenton Gravel - The Trenton Gravel overlies the Middle/Lower Clay beneath AOI 4. During Site characterization activities, the Trenton Gravel was observed as a very heterogeneous unit comprised of predominantly brown, reddish-brown, and gray sand and gravel, with minor amounts of silts and clays.

Recent Fill/Alluvium - Overlying the Trenton Gravel is recent fill/alluvium. The alluvium deposits generally consist of dark gray organic clayey mud or silt and fine sand. Fill type has historically varied across AOI 4 from various gravels to cinder ash.

In addition to the above descriptions, the following general observations can be made concerning the geology in AOI 4:

- The Fill/Alluvium, Trenton Gravel, Middle/Lower Clay, and the Lower Sand units all exist beneath AOI 4;
- The thickness of the Fill/Alluvium materials beneath AOI 4 ranges between 5-15 feet;
- The thickness of the Trenton Gravel beneath AOI 4 ranges between 20-45 feet;
- The thickness of the discontinuous Middle/Lower Clay at the eastern border of AOI 4 is approximately 2-20 feet; and
- The thickness of the Lower Sand beneath AOI 4 is approximately 15-40 feet.

2.2 Hydrogeology

Groundwater gauging data collected by Aquaterra Technologies, Inc. (Aquaterra) in June 2013 was used to generate a groundwater flow figure for the Fill/Alluvium and Trenton Gravel (Intermediate) zone in AOI 4 (Figure 6). This groundwater elevation data is provided as Table 3. Monitoring well construction details for the monitoring wells are provided in Table 1 and boring/well construction logs for the newly-installed monitoring wells are provided in Appendix C of this report. Historic boring/well logs for monitoring wells installed prior to the site characterization activities were provided in Appendix D of

the CCR. Based on the groundwater elevations as shown in Figure 6, the following observations can be made:

- Throughout the majority of AOI 4, groundwater gradients are generally low;
- There appears to be a groundwater divide located in the center of AOI 4;
- Groundwater flow in the northwestern portion of AOI 4 is towards the northwest, groundwater flow in the northeastern portion of AOI 4 is towards the east;
- Groundwater flow in the southern portion of AOI 4 is generally to the south and southeast; and
- Groundwater near the Penrose Recovery System (southern border of AOI 4) is influenced by the pumping at RW-715 thru RW-709.

2.3 Surface Water

No surface water features are located in AOI 4. The nearest surface water body to AOI 4 is the Schuylkill River which is located approximately 1,200 feet west of AOI 4. AOI 3 lies between the Schuylkill River and AOI 4.

3.0 SITE CHARACTERIZATION ACTIVITIES

The following sections summarize the site characterization activities that were completed in AOI 4 in support of this report. Site characterization activities were performed between 2005 and 2013 by Aquaterra and Langan in coordination with Sunoco.

3.1 Soil Borings and Sampling

A total of 30 shallow (0-2') and 53 deep (2-15') soil samples were collected between 2005 and 2013 from both soil boring locations as well as in conjunction with well installations. Soil borings were advanced utilizing a decontaminated stainless steel hand auger as well as split-spoon sampling techniques. The locations of the borings are shown on Figure 3. Soil borings were advanced at unpaved locations until groundwater was encountered. Shallow soil samples were collected at each soil boring location and, where groundwater was not encountered above two feet, a deep soil sample was also

collected. All samples were collected with a TerraCore sampler. At well locations S-222, S-223, S-224, gravel was encountered between 0 and 2 feet below the ground surface; therefore, shallow soil samples were collected from borings advanced in the immediate vicinity of these wells rather than at the well boring locations themselves as shown in Figure 3.

Prior to advancement, the hand auger was decontaminated by washing in an Alconox and distilled water solution and then rinsed using distilled water. Soil samples were collected in laboratory-prepared bottleware and immediately placed on ice. Soil samples were submitted to Lancaster Laboratories, Inc. (LLI) of Lancaster, Pennsylvania for analysis of site COCs in 2005 and to Accutest Laboratories of Dayton, NJ in 2013. The laboratory analytical reports are provided as Appendix C. Soil samples results are discussed in Sections 5.1 and 5.2 of this report.

3.2 Installation of Groundwater Monitoring Wells

Groundwater monitoring well installation activities were performed between March and June 2005 and between March and April 2013. The wells were completed by Parratt Wolff, Inc of Syracuse, New York and Total Quality Drilling, LLC of Mullica Hill, New Jersey under the direct supervision of Aquaterra and Langan in coordination with Sunoco. The locations of monitoring wells are shown on Figure 3. The well installation activities are discussed in the following section.

3.2.1 Trenton Gravel (Intermediate) Groundwater Monitoring Wells

Between March and June of 2005, Parratt Wolff, Inc of Syracuse, New York installed 12 Intermediate monitoring wells within the Trenton Gravel under the direct supervision of Aquaterra. Prior to installation of the monitoring wells, a PA One Call was performed for marking out utilities. Monitoring well locations were cleared to a depth between 6 to 10 feet below grade utilizing hydro excavation services provide by Environmental Industrial Services Corporation (EISCO) of Swedesboro, New Jersey. The Trenton Gravel 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 5 foot intervals throughout the borings, from 10 feet below grade to completion of the borehole. Monitoring wells were constructed to a maximum depth of 32 feet below grade with the

screen interval of 15 feet set within the Trenton Gravel. 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 3.

Augers were steam-cleaned between boreholes to eliminate cross contamination. Following construction, the wells were developed using a submersible pump until recovered water was sediment free or a minimum of three well volumes was pumped from the well.

Between March and April of 2013, 13 intermediate monitoring wells within the Trenton Gravel were installed by Total Quality Drilling of Mullica Hill, NJ under the direct supervision of Langan and Aquaterra. Prior to installation of the monitoring wells, a PA One Call was performed for marking out utilities. Locations of these wells are shown on Figure 3.

Prior to the installation of monitoring wells, each well location was cleared for subsurface utilities between 8 to 10 ft below ground surface (bgs) with a hydro-excavator by Badger Daylighting of Kearny, NJ. Prior to hydro- excavation, soil samples were collected with a stainless steel, decontaminated hand auger in 2' intervals. Samples were then screened with a photoionization detector (PID) and were collected in accordance with the sampling procedure outlined in Appendix J. Monitoring wells advanced by the drilling subcontractors utilized hollow stem augers and split spoon samplers to record lithology. Split spoon samples were collected at various intervals throughout the borings typically starting at 8 to 10 ft bgs if groundwater was not encountered above 10 ft bgs.

The Trenton Gravel 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 10 feet below grade. Monitoring wells were constructed to a maximum depth of 42 feet below grade with the screen intervals ranging from 10 to 30 feet set within the Trenton Gravel. 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.

Augers were steam-cleaned between boreholes to eliminate cross contamination. Following construction, the wells were developed using a submersible pump until recovered water was sediment free or a minimum of three well volumes was pumped from the well. Well construction details are provided in Table 2. Boring logs, lithology, and monitoring well construction details are provided in Appendix B.

3.3 Groundwater Monitoring

On May 9 through May 11, 2005, Handex performed monitoring well gauging activities to collect liquid levels from monitoring wells within AOI-4 as part of the semi-annual refinery well gauging program. Monitoring wells were gauged for depth to water, and if applicable, depth to product. Aquaterra also performed groundwater monitoring activities in an August 2005 gauging event for the fill/alluvium and Trenton Gravel wells in AOI 4. All well gauging readings from both of these events were summarized in the 2005 SCR for AOI 4.

On May 30 and 31, 2013, Aquaterra performed monitoring well gauging activities to collect liquid levels from monitoring wells within AOI 4 as part of the semi-annual facility well gauging program. Monitoring wells were gauged for depth-to-water, and if applicable, depth-to-product. All well gauging readings are summarized in Table 3.

The groundwater monitoring data from Table 3 was used to generate a shallow/intermediate groundwater elevation contour map provided as Figure 6. Based on the flow contours in Figure 6, the following observations can be made with regard to shallow groundwater flow in AOI 4:

- The groundwater gradient in the central portion of AOI 4 is relatively low;
- There appears to be a groundwater divide located in the center of AOI 4 from which groundwater flow is to the northwest, east, and to the south; and
- Groundwater flow in the southeastern portion of AOI 4 is influenced by pumping at the Penrose Total Fluids Recovery System.

3.4 Groundwater Sampling

Aquaterra performed the initial round of groundwater sampling activities for AOI-4 between April 28 and May 6, 2005. Wells S-96, S-223, S-224 and S-225 were sampled on August 1, 2005. All groundwater sampling activities were completed in accordance with the Work Plan. This sampling event was described in the 2005 AOI 4 SCR.

Aquaterra sampled 45 wells in June 2013 to evaluate current groundwater conditions as part of the 2013 investigation. The monitoring well sampling summary data report is provided as Appendix E of this report.

During the sampling events, to remove stagnant water from the well and obtain a representative sample, Aquaterra purged three well volumes prior to sampling. Following well purging activities, groundwater samples were collected by lowering a disposable bailer slowly into the monitoring well to minimize excess agitation. The bailer was filled with water from the top of the water table and retrieved. Samples were then collected in laboratory-prepared bottleware and immediately placed on ice. Samples were submitted to LLI in 2006 and Accutest in 2013 for analysis of site COCs. Once the sample was collected, the bailer, bailer cord, and nitrile gloves used to obtain the sample were discarded. Sample date, time, number, and site name were recorded on the chain-of-custody and in field books. For groundwater samples analyzed for lead, LLI and Accutest filtered the samples to analyze for dissolved lead concentrations. The laboratory analytical reports are included as Appendix D. Groundwater analytical results from the 2013 sampling event are discussed in Section 5.3 of this report.

3.5 LNAPL Sampling

LNAPL samples for select wells in AOI 4 were previously characterized as described in the CCR. As part of the recent characterization activities in June 2013, Aquaterra collected LNAPL samples from two additional monitoring wells in AOI 4: S-365 and S-369 on June 18, 2013. 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 Geochemistry of Tulsa, OK (Torkelson) for characterization. LNAPL characterization data included product types, density, proportions of product, degree of

weathering, and similarities to other samples. Appendix F and Section 5.4 of this report summarize the LNAPL characterization results for all samples collected in AOI 4 and previous results from wells in AOI 4.

During the AOI 4 May 2013 groundwater gauging event, 21 monitoring wells (S-29, S-32, S-35, S-103, S-104, S-123, S-124, S-220, S-124, S-220, S-221, S-233, S-235, S-236, S-237, S-238, S-240, S-241, S-278, S-279, S-282, S-365, and S-369) had measurable LNAPL. LNAPL samples from monitoring wells S-103, S-104, S-124, S-29, S-30, S-32, S-33, S-56, and S-97 were previously collected and characterized as part of the 2004 CCR. LNAPL samples from monitoring wells S-35, S-37, S-57, S-217, S-220, and S-221 were characterized for the AOI 4 2005 SCR. Product types were assigned to wells based on their proximity to previously fingerprinted locations and the results of the fingerprinting analysis.

3.6 Indoor Air Sampling

There is only one occupied building located in AOI 4 (15 Pump House) and this building is not under positive pressure. The location of the 15 Pump House is shown on Figure 7. The pump house is operated by PES and regulated by OSHA. In October 2012, Stantec conducted site wide indoor air sampling, as well as ambient air sampling, in and around the pump house. Stantec collected one indoor air sample and two outdoor ambient air samples related to the 15 Pump House. The sample locations are shown in Figure 7 of this report and the results of the sampling area are discussed in Section 5.5 of this report. A copy of the Stantec 2013 report is provided as Appendix G of this report.

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. Well elevations were determined to the nearest 0.01 foot relative to mean sea level. Survey activities were performed by a Pennsylvania-licensed surveyor and tied to the NAVD 88 datum. The new survey data for the monitoring wells is presented in Table 3. This new survey data was used to update the Geographic Information System (GIS) and site wide database for the facility.

3.8 Regulated Storage Tank Activities

Previously-existing and existing regulated ASTs in AOI 4 that have been closed-in-place or have a documented release are illustrated in Figure 8. Numerous ASTs were removed from AOI 4 prior to August 5, 1989. Conditions in tank areas where tanks were removed prior to August 5, 1989 are being characterized under the PA One Cleanup Program investigation and are discussed in this SCR/RIR. Tanks in AOI 4 that have been closed-in-place or have had a documented release since August 5, 1989 are summarized in the table below.

Summary of Regulated Storage Tanks in AOI 4
With Documented Releases or Closed-In-Place Since August 5, 1989
PES Facility, Philadelphia, PA

Tank No.	Closure Type	Documented Release (Yes or No)	Additional Comments
PB 826	NA	Yes	2005 SCR Issued
PB 843	Closed in Place	No	2007 Closure Report Issued
PB 844	Closed in Place	No	2008 Closure Report Issued
PB 845	Closed in Place	No	2008 Closure Report Issued
PB 846	Existing and then Closed in Place	Yes	2004 SCR Issued 2007 Closure Report Issued
PB 847	NA	Yes	2007 SCR Issued
PB 849	Closed in Place	No	2008 Closure Report Issued
PB 880	NA	Yes	2004 SCR Issued
PB 881	NA	Yes	2004 SCR Issued and 2005 SCR Issued
PB 885	NA	Yes	2007 SCR Issued

Notes:
NA = Not Applicable

Based on the summary table above, four tanks in AOI 4 (PB 843, PB 844, PB 845, and PB 849) have been closed-in-place. Closure and corrective action documentation for these tanks, consistent with requirements of 25 Pa Code §245.561, was prepared by others and previously submitted to the PADEP. Closure and corrective action documentation was prepared by Secor International Incorporated (SECOR) for PB 843 (March 2007), PB 844 (January 2008), PB 845 (February 2008) and PB 849 (January 2008).

One tank in AOI 4 (PB 846) has had a previous release and has been closed-in-place. Corrective action reports, consistent with requirements of 25 Pa Code §245.301-314, were prepared by others and previously submitted to the PADEP. Corrective action documentation for PB 846 was prepared by SECOR in January 2004. Closure and corrective action documentation for this tank, consistent with requirements of 25 Pa Code §245.561, was prepared by others and previously submitted to the PADEP. Closure and corrective action documentation was prepared by SECOR for PB 846 in December 2007.

Four existing tanks (PB 826, PB 847, PB 880 and PB 885) have had previous releases and one existing tank (PB 881) has had two associated releases. Corrective action reports, consistent with requirements of 25 Pa Code §245.301-314, were prepared by others and previously submitted to the PADEP. Corrective action documentation was prepared by SECOR for PB 826 (January 2005), PB 847 (January 2007), PB 880 (October 2004), PB 881 (October 2004 and December 2005) and PB 885 (April 2007).

One existing tank (PB 843) that had been closed-in-place by Sunoco in 2006, was recently reactivated by PES and it is currently in use for crude oil storage.

This SCR/RIR includes a Supplemental SCR (Appendix H of this report) for tanks PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885. The purpose of the Supplemental SCR is to document the status of each tank and to summarize the previous and more-recent supplemental closure and/or corrective action work completed by Sunoco in these tank areas.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The following sections outline the field and laboratory quality assurance/quality control measures that were incorporated into the site characterization activities. Groundwater gauging and sampling activities were completed in accordance with the field sampling procedures presented in Appendix I. The complete laboratory analytical data packages for the soil and groundwater sampling events are included in Appendix D.

4.1 Equipment Decontamination and Calibration

Sampling equipment was decontaminated in accordance with the field sampling procedures to prevent cross-contamination. Prior to sampling, the equipment was decontaminated with successive rinses of detergent and potable water and distilled deionized water. Down-hole equipment used in monitoring well purging, such as submersible pumps, was cleaned with an external non-phosphate detergent wash and tap water rinse. This cleaning process was followed by a flush of potable water. Prior to the use of sampling equipment (i.e. Horiba, PID, and electronic interface probe), the equipment was properly calibrated per the operating manual for that piece of equipment.

4.2 Sample Preservation

Samples were preserved, where necessary, with the addition of chemical preservatives, and by cooling the samples at 4°C before and during shipment to the laboratory. Chemical additives necessary for sample preservation were added to the sample containers by the analytical laboratory prior to releasing them to sampling personnel.

4.3 Laboratory Quality Assurance/Quality Control

Sample results summarized in 58 sample delivery groups from the 2006 to 2013 investigations provided by Lancaster Laboratories, Accutest Laboratories, The Washington Group (tank and Pace Analytical were evaluated for usability. Copies of the laboratory reports are provided in Appendix D. Langan investigations used Lancaster Labs and Accutest Laboratories for sample analysis. Pace Analytical, the Washington Group and Lancaster Labs were used for the tank investigations completed by SECOR and Stantec (refer to Appendix H).

The laboratory performed quality assurance and quality control (QA/QC) analyses, including laboratory control spikes and laboratory control spike duplicates, matrix spikes and matrix spike duplicates, surrogate spikes, method blanks and QA/QC checks such as GC/MS instrument tuning and mass calibration, as appropriate. Laboratory QA/QC summaries were completed by each laboratory and provided in the attached data packages. The analytical data, data qualifiers, and QC results provided in these reports were evaluated to determine the confidence with which the groundwater and soil data could be used in the Act 2 decision-making process.

Data quality indicators (DQIs) are qualitative and quantitative measures of data quality "attributes," which are descriptors used to express various properties of analytical data. Thus, DQIs are the various measures of the individual data characteristics that collectively comprise the general, all-encompassing term "data quality." Quality attributes used to assess the data usability include:

- Method selectivity/specificity;
- Method sensitivity
- Accuracy (bias);
- Precision;
- Representativeness;
- Comparability; and
- Completeness.

Based on evaluation of the above-mentioned indicators, the groundwater and soil data collected during this investigation are considered usable for characterizing the site, identifying compounds of concern, and delineating potential impacts, with the exceptions described in Appendix J (Data Usability Assessment). The number of samples collected is expected to provide sufficient data to satisfy the objective defined in the AOI 4 Work Plan.

4.4 Documentation

Chain-of-custody forms were maintained throughout the sampling program to document sample acquisition, possession and analysis. Chain-of-custody documentation

accompanied samples from the field to the laboratory. Each sample was assigned a unique number that was recorded on permanent field sheet.

5.0 SITE CHARACTERIZATION ANALYTICAL RESULTS

The following sections discuss the analytical results of the site characterization activities performed in AOI 4.

5.1 2005 Soil Analytical Results

A total of 10 soil samples were collected at monitoring well boring locations shown on Figure 3 utilizing a stainless steel hand auger. Soil borings were advanced to a maximum depth of two feet below grade at each location. At well locations S-222, S-223, S-224, gravel was encountered between zero and two feet below the ground surface; therefore, shallow soil samples were collected from borings advanced in the immediate vicinity of these wells as shown in Figure 3.

The results of the soil samples collected during this investigation are provided in Table 2. All of the soil samples were collected between 0 and 2 feet below the ground surface and no saturated soils were observed at these depths. The results of the soil samples were screened against the non-residential MSCs for soil. Based on the results, no concentrations of COCs in soil exceeded the applicable MSCs.

5.2 2013 Soil Analytical Results

In 2013, additional soil samples were collected to supplement the 2005 soil sampling activities that were presented in the 2005 SCR. At locations where shallow soil samples were previously collected, a deep soil sample was attempted in an effort to characterize deep soil. A total of 27 surface soil samples and 49 subsurface soil samples were collected. The surface and subsurface results are provided in Tables 4 and 5. 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 9. Below is a general summary of the screening results:

- 1,2,4-TMB, 1,3,5-TMB, benzene, and lead exceeded their respective non-residential MSCs; and

- 1,2-dibromoethane (EDB), 1,2-dichloroethane, dimethyl benzene, xylenes total, ethylbenzene, cumene, tert-butyl methyl ether, toluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, flourene, indenol(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene were not detected in AOI 4 soil at concentrations exceeding their respective non-residential MSCs.

5.3 Groundwater Results

The results of the groundwater samples collected from monitoring wells in AOI 4 during the sampling events between 2005 and 2013 are provided in Table 6. The results were screened against the PADEP non-residential used aquifer (TDS<2,500) groundwater MSCs. Locations with concentrations above the groundwater MSCs are illustrated in Figure 10.

A summary of the 2005 COC concentrations that exceeded the PADEP non-residential groundwater MSCs are presented below.

- Benzene, toluene, ethylbenzene, EDB, 1,2-dichloroethane, MTBE, chrysene, and naphthalene exceeded the non-residential MSCs in shallow groundwater; and
- Cumene, fluorene, phenanthrene, pyrene, total xylenes and total lead were not detected in AOI 4 shallow groundwater at concentrations exceeding the non-residential MSCs.

As part of the 2013 investigation, a supplemental round of groundwater sampling was completed in June 2013 to assess current AOI 4 groundwater conditions. A summary of the 2013 COC concentrations that exceeded the PADEP non-residential groundwater MSCs is below:

- 1,2,4-TMB, 1,3,5-TMB, benzene, ethylbenzene, MTBE, toluene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, naphthalene, and lead in AOI 4 shallow groundwater exceeded the non-residential MSCs; and
- EDB, 1,2-dichloroethane, dimethyl benzene, xylenes total, cumene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(g,h,i)perylene, chrysene, flourene, indenol(1,2,3-c,d)pyrene, phenanthrene, pyrene, were not detected in AOI 4 at groundwater concentrations exceeding their respective non-residential MSCs.

5.4 LNAPL Characterization Results

The results of the 2013 LNAPL characterization analysis were used to separate the apparent LNAPL plumes by LNAPL types and to also assist in the calculations of LNAPL specific volume and mobility using the American Petroleum Institute (API) LNAPL model, as summarized in Appendix F. The extent of LNAPL in AOI 4, based on the apparent LNAPL thickness measured during the June 2013 gauging event, is illustrated in Figure 11. LNAPL thicknesses measured in June 2013 in AOI 4 ranged from a 0.02 to 4.64 feet. LNAPL product type was determined for S-365 and S-369 during the 2013 site characterization activities. The LNAPL product types for S-365 and S-369 were identified as a mixture of unknown light material and middle distillate, and a mixture of middle distillate and alkylate, respectively. The unknown light material/middle distillate mixture identified in S-365 was assumed to be a gasoline and middle distillate mixture which corresponds to the previous LNAPL characterization results in this area of AOI 4. The middle distillate/alkylate mixture in S-369 was assumed to be middle distillate for the same reason.

LNAPL characterization results are presented in a Table F.1 of Appendix F. This table includes previous LNAPL characterization data collected for AOI 4 during the CCR and the 2005 site characterization activities. The LNAPL product types summarized in Table F.1 were applied to the June 2013 gauging data to generate the product plumes illustrated in Figure 11. The June 2013 gauging data was used to update the API LNAPL modeling in Appendix F.

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

- Two types of LNAPL mixtures were identified in monitoring wells S-365 and S-369 in AOI 4. An unknown light material/middle distillate mixture and a middle distillate/alkalyte mixture were identified in monitoring wells S-365 and S-369, respectively.

- Currently, there are three different types or mixtures of LNAPL that have been identified in AOI 4. The LNAPL types include middle distillate, gasoline/middle distillate, and middle distillate/light-end feedstock.
- The installation of the Penrose Avenue remediation system in AOI 4 was completed in December 2012. The system was started March 20, 2013. Approximately 181 gallons of LNAPL were recovered by the system during the second quarter 2013 reporting period.
- Due to the absence of recoverable product in recovery wells S-30, S-34, S-35, and S-36, these wells were taken offline by Sunoco.

5.5 Indoor Air Characterization Results

Stantec collected one indoor air sample and two outdoor ambient air samples from the inside and outside of the 15 Pump House in AOI 4. The results of the indoor air sample were compared to the OSHA permissible exposure limits (PELs) because the facility and the 15 Pump House is operated by PES and is regulated by OSHA. The results are as follows:

- The 15 Pump House indoor sample exhibited concentrations of benzene, toluene, ethylbenzene, total xylene, cumene, 1,3,5-TMB and 1,2,4-TMB above the reporting limit but below their corresponding OSHA PELs, EPA Industrial Regional Screening Levels (RSLs) and PADEP Industrial Indoor Air Quality (IAQs) criteria; and
- The outdoor ambient air sample under the equipment roof located approximately 8 to 10 feet below grade exhibited concentrations of benzene, toluene, ethylbenzene, total xylene, cumene and 1,2,4-TMB above the reporting limit but below their corresponding OSHA PELs, EPA RSLs and PADEP IAQs criteria.
- The outdoor ambient air sample under the equipment roof at grade exhibited concentrations similar to the indoor air sample where benzene, toluene, ethylbenzene, total xylene, cumene, 1,3,5-TMB and 1,2,4-TMB were detected above the reporting limit but were below the corresponding OSHA PELs, EPA RSLs and PADEP IAQs criteria.

Based on these results, the air sample collected from inside the building is below OSHA PELs, EPA Industrial RSLs and PADEP IAQs criteria for the protection of worker health.

The air sampling results are provided in Table 7 and the location of the 15 Pump House is shown on Figure 7. A copy of the Stantec 2013 indoor air sampling report is attached in Appendix G.

6.0 REMEDIAL SYSTEM UPDATE

6.1 LNAPL Recovery Systems

During 2012 and 2013, a total fluids recovery system was installed along the border of Penrose Avenue, near the intersection of 26th Street. This system consists of 16 recovery wells (RW-700 through RW-717) arranged in two arrays running parallel to Penrose Avenue. One row of 11 wells lies along the north side of G Avenue within the refinery and one row of five wells runs parallel to and approximately 150 feet north of G Avenue. Within each well, a 4" pneumatic QED Environmental Systems AP4 pump was installed and the wells tied into the system via subsurface total fluids transfer lines (water and LNAPL) and plant air lines for pump operation, with the exception of wells RW-707 and RW-710. RW-707 and RW-710 are not currently planned as recovery points, as they are considered redundant locations due to their proximity to another active recovery well. Therefore, there are currently 16 recovery wells piped into the system. The recovered water/LNAPL mixture is transported to a nearby treatment trailer for separation. After separation, recovered LNAPL is collected in a tank and is removed via vacuum truck and reused by the facility. Recovered water is monitored per the PWD discharge permit (#GW-02000) issued to Sunoco on 15 March 2010 (expires 15 March 2015). Per the permit requirements, samples are collected on a periodic basis for analysis of select volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and total xylenes (BTEX); metals including arsenic, cadmium, total chromium, copper, lead, mercury, nickel, silver, and zinc; and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM). The system was started on 20 March 2013.

Four other recovery wells are located in AOI 4 with their original intended purpose being the removal of LNAPL. These four recovery wells are part of two separate recovery systems. The S-30 Recovery System only includes recovery well S-30. The S-36 Recovery System includes recovery wells S-34, S-35 and S-36. These four recovery wells are equipped with pneumatic submersible skimming pumps. Due to lack of

recoverable product, both systems were taken offline in 2010 and have remained offline.

7.0 FATE AND TRANSPORT ANALYSIS

The following sections describe fate and transport modeling activities performed as part of AOI 4 Site characterization and the results. Details regarding the fate and transport modeling approach and results are in included in Appendix K.

7.1 Soil

No fate and transport modeling was completed for the soil analytical results since the only potential exposure pathway to shallow soil is by direct contact. PES's permit procedures and personal protective equipment (PPE) requirements eliminate the potential direct contact exposure pathway to subsurface soil. Potential exposure pathways for AOI 4 are discussed in detail in Section 9.0.

7.2 Groundwater

Fate and transport calculations were completed for groundwater in AOI 4 to evaluate the potential migration pathway of impacted groundwater to offsite receptors. AOI 4 is located on the eastern side of the PES facility and does not border the Schuylkill River. AOI 4 is bordered by AOI 3 to the west, and AOI 1 and AOI 2 to the north. Therefore, the only potential offsite receptors for impacted groundwater are located to the east and south of the AOI 4 boundary.

A fate and transport evaluation was previously completed for AOI 4 and is documented in the 2005 SCR. This report includes an updated fate and transport evaluation that incorporates the 2013 groundwater quality data. Eleven compounds of concern (COCs) were detected in groundwater during the June 2013 groundwater sampling event at concentrations above their respective MSCs (Figure 10). These COCs are benzene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, 1,2,4-TMB, 1,3,5-TMB, MTBE, ethylbenzene, toluene, naphthalene, and lead. To address the potential future migration of these COCs, a fate and transport analysis was performed using the Quick Domenico Version 2 (QD) spreadsheet model. No groundwater to surface water

discharge modeling was performed for AOI 4 as there is no potential for the impacts observed in the groundwater to be transported to the Schuylkill River or Delaware River under current hydraulic conditions. Site-specific data was used to complete the fate and transport calculations, when available.

Wells with COC concentrations above the groundwater MSCs that are not delineated by downgradient wells were modeled using QD. QD simulations were prepared for monitoring wells S-366, S-364, MW-4, S-36, S-379, S-28, S-381, S-223, RW-707, RW-710, S-243, S-329, and S-224. Six of the wells modeled (S-223, RW-7007, RW-710, S-243, S-329, and S-224) are in close proximity, or are associated with, the Penrose Avenue Recovery System. The Penrose Avenue Recovery System provides hydraulic control with respect to groundwater impacts observed in these wells. Fate and transport analysis for these wells was completed as a conservative measure to illustrate the potential for offsite migration of COCs in the absence of the Penrose recovery system.

Results of the fate and transport analysis show migration of COCs from AOI 4 and the potential for groundwater to impact offsite receptors is very low. For wells located outside the influence of the Penrose Avenue Recovery System, only benzene at S-379 [19.9 micrograms per liter (ug/l)] has the potential to migrate offsite. The benzene concentration at S-379 is predicted to attenuate in less than 25 feet from the PES facility property. The risk of benzene exposure from this well is considered very low due to the short attenuation distance after the AOI boundary, and the absence of any potential receptors in the area.

QD simulations for S-223, RW-707, RW-710 and S-224 predicted transport distances for benzene in excess of 800 feet. These simulations represent a worst case scenario in the absence of the pumping by the Penrose Recovery System. As indicated by the groundwater contours in Figure 10, the Penrose Recovery System is currently active, capturing and treating the groundwater impacts observed in the wells.

7.3 LNAPL

As discussed in Section 5.4 of this report, additional LNAPL data was collected to further refine LNAPL type, occurrence, volume and mobility throughout AOI 4, and to support LNAPL modeling activities discussed in Appendix F.

For the LNAPL modeling at AOI 4, Langan utilized the American Petroleum Institute (API) Publication Number 4682, "Free-Product Recovery of Petroleum Hydrocarbon Liquids," dated June 1999, as a guide for assessing LNAPL volume and mobility. Site-specific LNAPL data were collected as described in Section 5.4 of this report and used as input parameters for modeling where applicable. These parameters and the API model were utilized to estimate the specific volume and mobility of LNAPL at AOI 4 as discussed in Appendix F.

LNAPL modeling was previously completed in both the Current Conditions Report and 2005 AOI 4 Site Characterization Report. Results from previous modeling indicated areas of potential LNAPL mobility in the center and western side of AOI 4, however, they are considered low risk for migration because they are located several hundred or more feet from the facility boundary. Locations modeled either for the Current Conditions Report or 2005 AOI 4 Site Characterization Report were not re-evaluated as part of the current modeling effort because apparent LNAPL thicknesses for these wells have either remained constant or decreased since 2005.

Based on LNAPL fingerprinting or fingerprinting results of nearby wells, the primary LNAPL type in the 15 wells currently being evaluated is a middle distillate/light end feed stock mixture. LNAPL thicknesses in wells gauged prior to 2013 have generally remained steady or have decreased. In June 2013, 14 new wells in AOI 4 had measureable amounts of LNAPL. LNAPL thicknesses in these 14 wells ranged 0.02 feet at RW-701 to 2.55 feet at S-241. For the AOI 4 SCR/RIR update, LNAPL modeling was performed for these fifteen wells which were installed after the 2005 AOI 4 Site Characterization Report. One additional well, S-123 did not contain LNAPL prior to 2013, but contained measureable LNAPL during the 2013 gauging event.

The LNAPL modeling results indicate 11 wells (S-365, RW-700, S-237, S-238, S-236, S-240, S-282, S-241, S-235, S-233 and S-278) have calculated LNAPL seepage velocities

greater than 0.1 meter per year 9 of the 11 wells (all except S-282 and S-365) are located in the vicinity of the Penrose Avenue Recovery System. The high seepage velocities calculated for these wells is a function of the increased hydraulic gradients caused by the pumping of the system. LNAPL mobility in these wells does not pose a risk to offsite receptors since the Penrose Avenue Recovery System is actively capturing and preventing the migration of the LNAPL in this area. S-282 and S-365 are located along the western border of AOI 4 where hydraulic gradients indicate potential LNAPL migration from these wells would occur in the direction of AOI 3 and remain on the PES facility property.

An apparent LNAPL thickness of 0.03 feet was measured in S-369, which is located approximately 35 feet from the eastern boundary of the PES facility. The LNAPL thickness is very limited and the seepage velocity calculations indicate the LNAPL is essentially immobile (7. 6 x 10^{-7} meters per year). However, the extent of the LNAPL plume around S-369 is not delineated and possibly extends off the PES facility boundary. Delineation of the LNAPL in the vicinity of S-369 will be addressed in the Cleanup Plan.

7.4 Vapor Intrusion to Indoor Air

As referenced in Section 5.4, the Stantec indoor air sampling results for 15 Pump House indicated that all of the associated samples are below OSHA's PELs, EPA Industrial Regional Screening Levels (RSLs) and PADEP Industrial Indoor Air Quality (IAQs) criteria for the protection of worker health; therefore, the potential vapor intrusion pathway for existing buildings is not evaluated further. The 2013 Stantec report is attached in Appendix G.

8.0 SITE CONCEPTUAL MODEL

A preliminary site conceptual model (SCM) for the facility, including AOI 4, was presented in the CCR. The SCM for AOI 4 was further refined in the 2005 AOI 4 SCR, and is now further refined in this report. Data collected from the 2005 to 2013 site characterization activities performed in AOI 4 were used to further refine the SCM. The current SCM for AOI 4 is described the following sections.

8.1 Description and Site Use

AOI 4 is bordered by Hartranft Street to the North, 26th Street to the East, Penrose Avenue to the South, and AOI 3 to the West (Figures 1 and 2) and encompasses approximately 105 acres. Currently, AOI 4 is comprised of primarily Crude Oil and Gas Oil ASTs. Numerous below ground pipelines are active within AOI 4; this is the largest storage area in the refinery.

8.2 Geology and Hydrogeology

The following summarizes the relevant information concerning geology and hydrogeology in AOI 4:

- The Fill/Alluvium, Trenton Gravel, Middle/Lower Clay, and the Lower Sand all exist beneath AOI 4;
- The groundwater gradient in the central portion of AOI 4 is relatively flat;
- There appears to be a groundwater divide located in the center of AOI 4 from which groundwater flow is to the northwest, east, and to the south; and
- Groundwater flow in the most southeastern portion of AOI 4 is influenced by the total fluids pumping at the newly-installed Penrose Recovery System.

8.3 Compounds of Concern

The following summarizes the relevant information concerning COCs in AOI 4 based on the characterization work completed to date.

- Surface soil has exceedances of its MSC for lead. Lead was the only COC which was detected in surface soil at concentrations above the respective PADEP non-residential soil MSCs at 5 locations. All other site COCs were not detected in AOI 4 surface soil samples at concentrations above their respective PADEP non-residential soil MSCs.
- COCs which were detected in subsurface soil at concentrations above their respective PADEP non-residential soil MSCs, included: benzene (4 locations), lead (3 locations), 1,2,4-TMB (1 location), and 1,3,5-TMB (2 locations). All other

site COCs were not detected in AOI 4 subsurface soil samples at concentrations above their respective PADEP non-residential soil MSCs.

- COCs detected at concentrations above their respective PADEP non-residential groundwater MSCs in AOI-4 shallow groundwater include1,2,4-TMB (8 locations), EDB (1 location), 1,3,5-TMB (7 locations), 2-Hexanone (1 location), Arsenic (1 location), Benzene (27 locations), Benzo(a)pyrene (2 locations), Benzo(b)fluoranthene (2 locations), Benzo(g,h,i)perylene (2 locations), Chrysene (1 location), Ehtylbenzene (3 locations), Lead (1 location), Naphthalene (7 locations), MTBE (7 locations) and Toluene (3 locations). Remaining site COCs were not detected in AOI 4 shallow groundwater samples at concentrations above their respective PADEP non-residential groundwater MSC.

8.4 LNAPL Distribution and LNAPL Mobility

The following summarizes the relevant information concerning LNAPL distribution in AOI 4:

- Three LNAPL types or mixtures have been identified in AOI 4 (gasoline/middle distillate mixture, middle distillate, and middle distillate/light-end feedstock). The apparent thicknesses for each LNAPL plume in AOI 4 are provided in Figure 11.
- Previous LNAPL modeling performed in AOI 4 for the CCR and the 2005 SCR indicated the only areas of LNAPL mobility are located in the center and western portion of AOI 4 and pose little risk of migrating off site.
- Eleven wells (RW-700, S-233, S-235, S-236, S-237, S-238, S-240, S-241, S-278, S-282, and S-365) have calculated LNAPL seepage velocities greater than 0.1 meter per year.
- The majority of the wells with potential LNAPL mobility are located in the southern portion of AOI 4. LNAPL mobility in these wells does not pose a risk to offsite receptors based on the active recovery of LNAPL and groundwater at the Penrose Avenue Recovery System.

8.5 Fate and Transport of COCs

Based on the fate and transport evaluation performed for AOI 4, potential off-site migration of dissolved COCs in groundwater above the MSCs does exist in the

southeastern portion of AOI 4; however, the Penrose Avenue Recovery System serves as an engineering control to prevent the migration of impacted groundwater/LNAPL off-site in this area. No other areas exhibit the potential for off-site migration of dissolved COCs in groundwater.

8.6 Potential Migration Pathways and Site Receptors

The following summarizes potential migration pathways and site receptors (i.e., the exposure assessment) for AOI 4. Site characterization has been completed to address each of the potential pathways listed below.

- AOI 4 is situated within a fenced, secured area to prevent unauthorized access to trespassers.
- The potential direct contact pathway to soil between 0-2 two feet by facility workers is deemed complete.
- The potential direct contact pathway to soil greater than two feet by facility workers is deemed incomplete based on PES's existing permitting procedures which protect against worker exposure to soil encountered in excavations.
- The potential direct contact pathway to groundwater by facility workers is deemed incomplete based on PES's existing permitting procedures which prevent exposure to groundwater that may be encountered in excavations.
- The indoor air assessment completed in the 15 Pump House resulted in COC concentrations below OSHA PELs, EPA RSLs and PADEP IAQs criteria.
- No human health groundwater receptors exist for the facility.

Based on the fate and transport evaluation performed for AOI 4, potential off-site migration of dissolved COCs in groundwater above the MSCs does exist in the southeastern portion of AOI 4; however, the Penrose Recovery System serves as an engineering control to prevent the migration of impacted groundwater/LNAPL off-site in this area. No other areas exhibit the potential for off-site migration of dissolved COCs in groundwater.

The exposure assessment completed for the COCs above the PADEP non-residential MSCs is discussed in Section 9.0 of this report.

9.0 HUMAN HEALTH EXPOSURE ASSESSMENT/RISK ASSESSMENT

Based on the current and future intended non-residential site use, an exposure assessment was conducted for all COCs which exceeded the non-residential statewide health standards in shallow soils (0-2 feet bgs) or deep soils (2-15 feet bgs). Potential human health exposures for the facility are for an industrial worker scenario.

Direct contact exposure pathways to shallow soil, groundwater, and LNAPL is being evaluated under the industrial use scenario because PES has well-documented standards for PPE and procedures for soil excavation and handling.

The following table serves to summarize potential pathways that can be reasonably expected under the current and intended future non-residential use for AOI 4. The table lists potentially contaminated media, potential receptors for these media, and a summary of whether any potential pathways exist at the site from the media to these receptors.

Potential for Complete Exposure Pathways

Contaminated Media	Residents	Workers	DayCare	Construction	Trespassers	Recreation	Food
Groundwater	NA	No(1)	NA	No (3)	No	NA	NA
Air (indoor)	NA	No	NA	No	No	NA	NA
Soil <2 feet bgs.	NA	No	NA	No	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 (4)	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 pathway for site soil > 2 feet deep due to on-site procedures and PPE.
(3) No complete groundwater or LNAPL pathway exists for construction workers due to PPE requirements and Standard Operating Procedures.
(4) No complete pathway exists for site soil > 2 feet deep due to PPE requirements and Standard Operating Procedures.

Na - Not applicable.
No - No potential complete exposure pathway
Yes – Potential complete exposure pathway

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

9.1 Surface Water /Sediment

There are no surface water features located within AOI 4. The nearest surface water body to AOI 4 is the Schuylkill River which is located approximately 1,200 feet west of AOI 4. AOI 3 lies between the Schuylkill River and AOI 4 (Figure 1).

Based on the distance of AOI 4 from the Schuylkill River, groundwater flow, and the results of the fate and transport evaluation, none of the constituents detected in groundwater are likely to cause an in-stream violation of surface water quality criteria for the Schuylkill River.

9.2 Soils (0-15 Feet Below Grade)

Direct Contact Exposure

Based on the data collected between 2004 and 2013, concentrations of benzene, lead, naphthalene, toluene, and EDB were detected in shallow soils above the non-residential soil MSC and concentrations of benzene, lead, naphthalene, ethylbenzene, EDB, 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-trimethylbenzene (1,3,5-TMB) were detected in deep soils above the non-residential soil MSC. To refine the list of compounds carried forward in the risk assessment, the compounds listed above were further screened against the EPA Region III Risk-Based Concentrations (aka, EPA Regional Screening Levels [RSLs]) in accordance with Section IV of the PADEP's Technical Guidance Manual (TGM) (dated June 8, 2002). Based on this screening, concentrations of 1,3,5-TMB, 1,2,4-TMB, toluene, EDB and ethylbenzene were below the EPA RSLs for industrial soil and were, therefore, eliminated from the risk assessment. Concentrations of benzene, lead and naphthalene were above the EPA RSLs and were, therefore, further evaluated as outlined in the January 2013 Soil Screening Procedure for Philadelphia Energy Solutions memorandum (Sunoco 2013).

As described in the January 2013 memorandum, the compounds that exceeded both the non-residential statewide health standards and EPA RSLs were compared to the PADEP's Non-Residential Direct Contact MSC. To maintain conservatism, all soil samples (surface and subsurface) were screened against the more stringent 0-2 feet below grade direct contact criteria regardless of sample depth in the event that soils are re-used elsewhere on the Facility. Based on this screening, concentrations of benzene and naphthalene were eliminated from the risk assessment. The analyte identified for

further risk assessment is lead. Since most lead-based human health effects data are based on blood-lead concentrations instead of external dose, the traditional approach for risk assessment is not applied to characterize exposure to lead.

The site-specific screening level for lead was calculated based on ingestion as presented in 25 Pa. Code § 250.306(e), Appendix A, Table 7. As described in 25 Pa. Code § 250.306(e), the non-residential soil screening value for lead is based on the method presented in the report 'The Society for Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil' (Wixson, 1991). The model used by the PADEP and developed by SEGH was also used to calculate the site specific criterion for the facility. Based on the SEGH model and PADEP's default parameters, PADEP's non-residential direct contact MSC default value for lead in surface soil is 1,000 mg/kg. To develop a site-specific criteria for lead, the values used by PADEP for the target blood lead concentration (T) and geometric mean background blood lead concentration (B) were revised in consideration of site-specific conditions and updated lead data collected by the US Center for Disease Control and Prevention (CDC). Revised values for these parameters are discussed in the following paragraphs.

As presented in Appendix L, based on the revised parameters, the derived site-specific standard for lead in soil is 1,708 mg/kg for a facility worker. Three shallow soil samples (S-381_0-5, BH-13_103_0-1 and BH-13-99_1.5-2) and three deep soil samples (S-381_2-3, BH-13-86_5.5-6 and BH-13-99_2.5-3) have concentrations of lead above the site specific criteria and will be delineated and remediated as described in the Clean-up Plan.

9.3 Groundwater

Results of the groundwater sampling indicated COCs at concentrations above their respective PADEP non-residential groundwater MSCs, including: benzene, chrysene, benzo(a)pyrene, benzo(b)fluoranthene, 1,2,4-TMB, 1,3,5-TMB, toluene, 1,2-dichloroethane, MTBE, total xylenes, EDB, ethylbenzene, naphthalene and lead. Based on the fate and transport evaluation performed for AOI 4, potential off-site migration of dissolved COCs in groundwater above the MSCs does exist in the southeastern portion of AOI 4; however, the Penrose Recovery System serves as an engineering control to prevent the migration of impacted groundwater/LNAPL off-site in this area. No other areas exhibit the potential for off-site migration of dissolved COCs in groundwater. In

addition, there is no risk to exposure to ecological receptors associated with the Schuylkill River.

Excavations in AOI 4 are governed by PES's permitting procedures which protect against potential exposures to groundwater that could be encountered in an excavation. Therefore, there are no complete direct contact exposure pathways for groundwater within AOI 4. Previous investigations and recent (2013) PAGWIS well searches indicate that there is one "unknown use" well located within 1.0 miles of the facility and its intended use is currently under investigation by Sunoco.

9.4 LNAPL

There are no complete direct contact exposure pathways for LNAPL within AOI 4 because of on-site procedures and required PPE (same as groundwater).

9.5 Vapor

In October 2012, Stantec completed an indoor air assessment that included all occupied buildings at the facility that are not under positive pressure (Appendix I). In AOI 4, that evaluation included the 15 Pump House Building.

Congress designated the OSHA as the lead agency to regulate worker exposure in industrial settings in the Occupational Health and Safety Act of 1970. Consequently, the potential vapor intrusion risk to industrial workers at AOI 4 was assessed by comparing results of the indoor air samples to OSHA's PEL (8-hour time weighted average). At the 15 Pump House Building, benzene, toluene, ethylbenzene, total xylene, cumene, 1,3,5-TMB and 1,2,4-TMB were detected above the reporting limit but below the corresponding PEL by multiple orders of magnitude in one indoor air sample. Similarly, benzene, toluene, ethylbenzene, total xylene, 1,3,5-TMB and 1,2,4-TMB were detected above the reporting limit but below the corresponding PEL by multiple orders of magnitude in two outdoor air samples. Given that all samples collected from the building located in AOI 4 meet OSHA's exposure limits for the protection of worker health, the potential vapor intrusion pathway for existing buildings is not evaluated further in the risk assessment because though the 15 Pump House is operated by PES, it is regulated by OSHA.

10.0 ECOLOGICAL ASSESSMENT

The majority of AOI 4 is covered with impervious surfaces or gravel ("covered areas") as shown in Appendix B. The non-covered areas of AOI 4 are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. No surface water features are located in AOI 4.

In August 2013, an AOI 4-specific review of endangered, threatened and special concern wildlife was conducted by submitting a request to the Pennsylvania Natural Diversity Inventory (PNDI) online database (Appendix M). The PNDI search identified potential threatened and endangered species impacts under the jurisdiction of the PA Fish and Boat Commission (PFBC) that require further review. In August 2013, a Consultation Letter (Appendix M) was submitted to the PFBC to request further investigation and clearance based on ecological impact potential. A PNDI Clearance Letter from the PFBC was received on September 23, 2013 which is valid for two years. No further consultation related to threatened and endangered species is required by any of the jurisdictional agencies related to Act 2 related work.

11.0 COMMUNITY RELATION ACTIVITIES

A Community Relation Plan (CRP) that includes public involvement with local residents to inform them of the anticipated investigations and remediation activities was completed as part of the NIR submittal in 2006. The purpose of this CRP is to provide a mechanism for the community, government officials, and other interested or affected citizens to be informed of on-site activities related to the investigation activities at the Site. This plan incorporates aspects of public involvement under both PADEP's Act 2 program and EPA's RCRA Corrective Action program. The Act 2 required public and municipal notices for this report were processed, and copies of the notices and proof of their publication/receipt are included in Appendix A.

12.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the completed activities, the following conclusions and recommendations have been developed for AOI 4:

SOIL

- Concentrations of benzene, 1,2,4-TMB, 1,3,5-TMB, and lead detected in soil samples collected in AOI 4 were above their respective PADEP non-residential soil MSCs.
- Based on the human health risk assessment completed, the total cumulative risk of exposure to the carcinogenic compounds benzene and benzo(a)pyrene is 1E-05 and within the PADEP's acceptable threshold; therefore, no remedies are required to address carcinogenic risks. Three shallow soil samples (S-381_0-5, BH-13_103_0-1 and BH-13-99_1.5-2) and three deep soil samples (S-381_2-3, BH-13-86_5.5-6 and BH-13-99_2.5-3) have concentrations of lead above the calculated site specific criteria and will be delineated and remediated as described in the Clean-up Plan.
- The potential direct contact to facility worker pathway to soil greater than 2 feet beneath the ground surface at the facility is incomplete because of PES's on-site procedures and PPE requirements that protect onsite workers from exposure to soils in an excavation. The soil-to-groundwater pathway was evaluated using shallow groundwater data discussed below.

GROUNDWATER

- Based on the results of the fate and transport analysis, only benzene at S-379 has the potential to extend beyond the facility boundary. Fate and transport simulations predict a migration distance of less than 25 feet from the PES facility boundary before attenuation below the MSC for benzene. The risk of benzene exposure from this well is considered very low due to the short attenuation distance after the AOI boundary, and the absence of any potential receptors in the area. In addition, the Penrose Recovery System serves as an engineering control that prevents migration of shallow groundwater beyond the facility boundary.
- There are no complete direct contact exposure pathways for groundwater within AOI 4 because of on-site facility safety procedures and required PPE. Previous investigations and a recent (2013) PAGWIS well search identified that one well of "unknown use" is

located within 1.0 miles of the facility. Sunoco is currently investigating the intended use of this well.

LNAPL

- Based on occurrence and mobility of LNAPL in AOI 4, and gauging of wells along the facility boundary, LNAPL does not appear to have migrated off site. LNAPL near the southern portion of AOI 4 is being controlled by the Penrose Avenue Recovery System.
- LNAPL in S-369 will be further characterized and addressed in the Cleanup Plan for AOI 4.

VAPOR INTRUSION

- An indoor air sample collected from the 15 Pump House, the only occupied building in AOI 4, was below OSHA's PELs for the protection of worker health.

13.0 SCHEDULE

The proposed schedule for future Site activities is:

- Submittal of a Cleanup Plan following PADEP approval of the SCR/RIR;
- Submittal of a Final Report; and
- Continue quarterly monitoring activities and reports.

14.0 SIGNATURES

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



James Oppenheim
Sunoco Inc. (R&M)

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

15.0 REFERENCES

U.S. Department of the Interior, Geohydrology and Ground-Water Resources of Philadelphia, Pennsylvania, U.S. Geological Survey, Water-Supply Paper 2346.

Schreffler, C. L., 2001, U.S. Department of the Interior, Simulation of Ground-Water Flow in the Potomac-Raritan-Magothy Aquifer System Near the Defense Supply Center Philadelphia, and the Point Breeze Refinery, Southern Philadelphia County, Pennsylvania, Water-Resources Investigations Report 01-4218, 20 pp.

URS Corporation, 2002, Act 2 Combined Report, Philadelphia Energy Center, Sunoco Philadelphia Refinery, Girard Point Processing Area.

Moffitt, G. R., Chevron, 1992, RCRA Verification Investigation Final Report.

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

Pennsylvania Department of Environmental Protection, 2003, Document Number 253-0300-100, Land Recycling Program Technical Guidance Manual – Section IV.A.4. Vapor Intrusion Into Buildings From Groundwater and Soil Under the Act 2 Statewide Health Standard.

Site Characterization Report AOI 4, Sunoco Inc., Philadelphia, PA, prepared by Langan Engineering and Environmental Services August 29, 2005.

Development of Site-Specific Soil and Groundwater Criteria for Sunoco Marcus Hook and Philadelphia Refineries, Sunoco, Inc. (R&M), January 7, 2013.

TABLES

Table 1
AOI-4 Existing Well Summary
Sunoco PES Facility
Philadelphia, Pa

AOI #	Well ID	Former Well ID[3]	Well Status/ Description	Disposition of Well	Northing	Easting	Well Type	Well Classification (Shallow, Intermediate, Deep)[4]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[2]							
												Well Completion Depth (ft. bgs)	Well Diameter (in)	Top of Inner Casing Elevation (ft. msl) (NAVD88)	Ground Surface Elevation (ft.) (NAVD88)	Top of Screen Elevation (ft) (NAVD88)	Bottom of Screen Elevation (ft) (NAVD88)	Depth to Screen (ft. bgs)	Screen Length (ft.)
4	AS-9	--			--	--	Piezometer	--	Y	Y	2/15/82	33.25	3	19.51	--	--	--	23.25	10
4	S-102	--			221406.750	2683873.830	Monitoring Well	Shallow	Y	Y	10/17/95	20	2	18.22	15.63	10.63	-4.37	5	15
4	S-103	--			221274.570	2684427.940	Monitoring Well	Shallow	Y	Y	10/17/95	25	2	26.11	23.55	13.55	-1.45	10	15
4	S-104	--			221448.270	2684803.510	Monitoring Well	Shallow	Y	Y	10/17/95	20	2	18.56	15.63	5.63	-4.37	10	10
4	S-119	MW-E			220752.860	2685393.240	Monitoring Well	Intermediate	Y	Y	8/15/02	34	4	26.60	23.82	9.82	-10.18	14	20
4	S-120	MW-F			220402.980	2685596.680	Monitoring Well	Intermediate	Y	Y	8/16/02	30	4	19.82	16.47	6.47	-13.53	10	20
4	S-121	MW-G			220221.940	2685120.470	Monitoring Well	Intermediate	Y	Y	8/22/02	30	4	21.12	18.53	8.53	-11.47	10	20
4	S-122	MW-H			219646.600	2685442.910	Monitoring Well	Intermediate	Y	Y	8/19/02	34.6	4	25.71	22.92	7.92	-12.08	15	20
4	S-123	MW-I			219320.350	2684990.320	Monitoring Well	Intermediate	Y	Y	8/20/02	30	4	22.13	19.23	9.23	-10.77	10	20
4	S-124	MW-J			218884.830	2685003.670	Monitoring Well	Intermediate	Y	Y	8/22/02	30	4	23.20	20.46	10.46	-9.54	10	20
4	S-26	SM-33			218758.260	2684615.950	Monitoring Well	Intermediate	Y	N	12/17/84	24	--	20.76	17.60	--	--	--	--
4	S-27	SM-42			219121.695	2684393.051	Monitoring Well	Intermediate	Y	Y	3/19/85	34.75	--	24.61	24.48	--	--	--	30
4	S-28	SM-29			219583.400	2684391.350	Monitoring Well	Shallow	Y	N	12/17/84	25	--	25.74	22.66	--	--	--	--
4	S-29	59			219694.790	2684380.200	Monitoring Well	Intermediate	Y	Y	12/8/86	40	--	23.30	21.83	3.83	-18.17	18	22
4	S-30	--			219702.610	2684379.560	Recovery Well - Active	Intermediate	--	--	--	--	--	23.13	21.64	--	--	--	--
4	S-31	SM-53			219592.262	2684202.251	Monitoring Well	Shallow	Y	N	7/31/85	25	--	21.30	21.28	--	--	--	--
4	S-32	SM-27			219917.060	2684135.820	Monitoring Well	Shallow	Y	N	12/17/84	25	--	24.20	21.29	--	--	--	--
4	S-34	PN-1			220356.691	2684176.992	Monitoring Well	Shallow	Y	Y	5/25/87	29	6	20.89	20.89	3.89	-6.11	17	10

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

NOTES:

AOI - Area of Interest
ft. - feet
bgs - below ground surface
in. - inches
msl - elevation relative to mean sea level
g/cc - grams per cubic centimeter
NA - Data not available
*Product type percentage data not available

1. For wells that have not been surveyed by Langan, the pre-existing elevations (in NVGD 29) were converted to NAVD 88 (conversion factor is 1.05 ft).
2. Well construction details were taken directly from well boring logs provided by Handex, Secor, Aquaterra or collected from available historic reports. Where no well boring logs exist, no well construction or lithologic data is listed.
3. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.
4. Well classification based on the formation in which the well was screened in. Wells screened within the Middle Clay or the Farrington Sand were classified as deep wells.
   Well classification for wells screened above the Lower/Middle Clay were based on the following: screened in Fill/Alluvium - Shallow, screened in Trenton Gravel - Intermediate, screened in Fill/Alluvium & Trenton Gravel - Shallow/Intermediate
5. Product characterization data obtained from Sunoco's 2004 CCR and 2005 through 2013 Site Characterization Reports for AOIs 1 through 10.
6. For wells with no direct LNAPL density measurements, the density value in the nearest well with LNAPL data was used.

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Philadelphia, Pa

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												Well Completion Depth (ft. bgs)	Well Diameter (in)	Top of Inner Casing Elevation (ft. msl) (NAVD88)	Ground Surface Elevation (ft.) (NAVD88)	Top of Screen Elevation (ft) (NAVD88)	Bottom of Screen Elevation (ft) (NAVD88)	Depth to Screen (ft. bgs)	Screen Length (ft.)
4	S-35	PN-2			220363.967	2684236.720	Monitoring Well	Shallow	Y	Y	5/28/87	29	6	20.94	21.55	4.55	-5.45	17	10
4	S-36	SM-34			220366.090	2684276.100	Monitoring Well	Shallow	Y	N	12/18/84	21.5	–	24.23	21.91	–	–	–	–
4	S-38	SM-31			219183.830	2685232.490	Monitoring Well	Shallow	Y	N	12/19/84	23.2	–	18.95	15.97	–	–	–	–
4	S-39	AS-7			220133.110	2685582.260	Monitoring Well	Intermediate	Y	Y	2/4/84	37	3	22.88	21.35	-3.65	-15.15	25	11.5
4	S-40	SM-55			220733.630	2685637.310	Monitoring Well	Shallow	Y	N	7/31/85	28	–	24.46	21.67	–	–	–	–
4	S-56	62			220723.490	2684592.770	Monitoring Well	Shallow	Y	Y	12/13/86	29	2	15.00	13.45	-0.55	-15.55	14	15
4	S-57	SM-24			220382.650	2683745.490	Monitoring Well	Shallow	Y	N	12/18/84	14	–	12.50	10.13	–	–	–	–
4	S-58	RW-1			–	–	Recovery Well - Inactive	–	Y	Y	6/23/87	33	–	–	–	–	–	10	20
4	S-67	SM-22			–	–	Monitoring Well	–	Y	–	12/18/84	20	–	–	–	–	–	–	–
4	S-96	–			220718.530	2684857.120	Monitoring Well	Shallow	–	–	–	–	–	19.77	–	–	–	–	–
4	S-97	–	Repaired	Converted to Flush Mount	219546.080	2684857.010	Monitoring Well	Shallow	Y	Y	4/4/94	35	4	28.37	28.74	8.74	-6.26	20	15
4	S-216	–			220866.960	2684617.940	Monitoring Well	Intermediate	Y	Y	4/19/05	26	4	15.76	14.57	4.76	-10.24	11	15
4	S-218	–			220121.840	2684500.980	Monitoring Well	Intermediate	Y	Y	4/20/05	30	4	25.74	22.46	10.74	-4.26	15	15
4	S-219	–			219892.000	2684850.330	Monitoring Well	Intermediate	Y	Y	3/25/05	27	4	23.09	19.88	11.09	-3.91	12	15
4	S-220	–			219151.900	2684262.280	Monitoring Well	Intermediate	Y	Y	4/20/05	30	4	20.81	18.50	5.81	-9.19	15	15
4	S-221	–			219006.130	2684933.430	Monitoring Well	Intermediate	Y	Y	4/21/05	30	4	23.00	20.02	7.98	-7.02	15	15
4	S-222	–			218676.906	2684861.776	Monitoring Well	Intermediate	Y	Y	6/9/05	28	4	16.29	16.89	3.29	-11.71	13	15
4	S-223	–			218858.534	2685063.585	Monitoring Well	Intermediate	Y	Y	6/8/05	30	4	15.88	16.48	1.48	-13.52	15	15
4	S-224	–			218991.351	2685158.159	Monitoring Well	Intermediate	Y	Y	6/6/05	32	4	16.03	16.53	4.53	-15.47	12	20
4	S-225	–			221122.910	2684548.850	Monitoring Well	Intermediate	Y	Y	3/29/05	27	4	16.86	14.14	4.86	-10.14	12	15
4	S-233	–			218922.835	2684873.793	Monitoring Well	Intermediate	Y	Y	10/17/05	30	4	24.35	21.63	9.35	-5.65	15	15
4	S-234	–			218761.786	2684898.540	Monitoring Well	Intermediate	Y	Y	10/18/08	27	4	21.23	18.04	9.23	-5.77	12	15
4	S-235	–			218843.840	2684961.527	Monitoring Well	Intermediate	y	Y	10/18/05	30	4	23.13	20.21	8.13	-6.87	15	15
4	S-236	–			219018.432	2684953.845	Monitoring Well	Intermediate	Y	Y	10/19/05	32	4	22.97	19.72	5.97	-9.03	17	15
4	S-237	–			218984.401	2684943.306	Monitoring Well	Intermediate	Y	Y	10/19/05	32	4	22.82	19.39	5.82	-9.19	17	15
4	S-238	–			218916.689	2685034.493	Monitoring Well	Intermediate	Y	Y	10/21/05	30	4	22.92	19.87	7.92	-7.09	15	15
4	S-239	–			218788.677	2684997.324	Monitoring Well	Intermediate	Y	Y	10/24/05	25	4	15.82	16.19	5.82	-9.18	10	15
4	S-240	–			218980.390	2684848.140	Monitoring Well	Intermediate	Y	Y	10/24/05	30	4	23.86	20.97	8.86	-6.14	15	15
4	S-241	–			219044.987	2684818.765	Monitoring Well	Intermediate	Y	Y	10/24/05	30	4	26.08	23.09	11.08	-3.92	15	15
4	S-242	–			218813.239	2684857.203	Monitoring Well	Intermediate	N	–	–	–	–	21.89	19.15	–	–	–	–
4	S-243	–			218722.241	2684934.273	Monitoring Well	Intermediate	N	–	–	–	–	15.74	16.18	–	–	–	–
4	S-244	–			219110.021	2685081.871	Monitoring Well	Intermediate	N	–	–	–	–	21.94	18.73	–	–	–	–
4	S-245	–			219051.042	2684999.415	Monitoring Well	Intermediate	N	–	–	–	–	22.21	19.66	–	–	–	–

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

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4	S-246	–			219005.316	2685017.554	Monitoring Well	Intermediate	N	–	–	–	–	21.56	19.34	–	–	–	–
4	S-278	–			218752.790	2684809.980	Monitoring Well	Intermediate	Y	Y	11/18/09	29	4	21.03	17.70	7.03	-7.97	14	15
4	S-279	–			219165.690	2684701.460	Monitoring Well	Intermediate	Y	Y	11/18/09	29	4	26.45	23.45	12.45	-2.55	14	15
4	S-282				220826.502	2683959.500	Monitoring Well	Shallow/Intermediate	Y	Y	4/27/10	20	2	20.79	18.49	13.49	-1.51	5	15
4	RW-700	–			218992.669	2684981.860	Recovery Well	Intermediate	Y	Y	8/27/10	38	4	18.01	19.25	–	–	13	20
4	RW-701	–			218971.520	2684953.056	Recovery Well	Intermediate	N	Y	8/25/10	37	4	18.27	19.34	–	–	7	25
4	RW-702	–			218950.473	2684925.809	Recovery Well	Intermediate	N	Y	8/25/10	39	4	20.96	21.24	–	–	14	20
4	RW-703	–			218926.125	2684901.345	Recovery Well	Intermediate	N	Y	8/24/10	34	4	20.62	21.61	–	–	9	20
4	RW-704	–			218910.953	2684874.513	Recovery Well	Intermediate	N	Y	8/25/10	26	4	20.23	22.13	–	–	6	20
4	RW-705	–			218913.897	2685079.941	Recovery Well	Intermediate	Y	Y	10/5/10	38	4	15.92	16.91	–	–	8	25
4	RW-706	–			218860.882	2685031.985	Recovery Well	Intermediate	N	Y	10/4/10	39.5	4	15.89	16.81	–	–	9.5	25
4	RW-707	–			218852.263	2685021.555	Recovery Well	Intermediate	Y	Y	8/31/10	36.5	4	16.29	16.87	–	–	11.5	20
4	RW-708	–			218831.366	2685001.413	Recovery Well	Intermediate	N	Y	9/1-2/10	38	4	15.49	16.77	–	–	13	20
4	RW-709	–			218811.763	2684982.053	Recovery Well	Intermediate	N	Y	9/2/10	38	4	15.30	16.52	–	–	13	20
4	RW-710	–			218790.250	2684962.881	Recovery Well	Intermediate	N	Y	9/3-7/10	37	4	15.88	16.32	–	–	12	20
4	RW-711	–			218782.571	2684955.077	Recovery Well	Intermediate	N	Y	9/21/10	41	4	15.49	16.72	–	–	11	25
4	RW-712	–			218762.380	2684936.126	Recovery Well	Intermediate	N	Y	9/21/10	39	4	15.56	16.68	–	–	9	25
4	RW-713	–			218748.069	2684924.219	Recovery Well	Intermediate	Y	Y	9/7/10	37	4	15.02	16.59	–	–	12	20
4	RW-714	–			218727.410	2684903.449	Recovery Well	Intermediate	N	Y	9/8/10	37	4	15.21	16.47	–	–	12	20
4	RW-715	–			218705.806	2684883.428	Recovery Well	Intermediate	Y	Y	9/15/10	40	4	15.37	16.86	–	–	10	25
4	RW-716	–			218684.670	2684863.323	Recovery Well	Intermediate	Y	Y	9/16/10	40	4	15.54	16.91	–	–	10	25
4	RW-717	–			218663.736	2684843.635	Recovery Well	Intermediate	N	Y	9/17/10	40	4	15.61	16.86	–	–	10	25
4	S-329	–			218689.633	2684779.003	Monitoring Well	Intermediate	N	Y	9/20/10	40	4	20.92	18.20	–	–	10	25
4	S-364				221075.221	2683860.865	Monitoring Well	Shallow/Intermediate	Y	Y	3/19/13	30	4	21.33	18.81	–	–	15	15
4	S-365				220854.649	2683838.836	Monitoring Well	Shallow/Intermediate	Y	Y	3/18/13	30	4	20.75	18.15	–	–	15	15
4	S-366				221391.626	2684586.165	Monitoring Well	Shallow/Intermediate	Y	Y	3/15/13	30	4	22.26	20.51	–	–	15	15
4	S-367				221273.785	2684688.494	Monitoring Well	Shallow/Intermediate	Y	Y	3/13/13	28	4	16.02	13.51	–	–	13	15
4	S-368				221485.158	2684900.542	Monitoring Well	Shallow/Intermediate	Y	Y	3/14/13	28	4	18.02	15.45	–	–	13	15
4	S-369				221204.234	2685725.712	Monitoring Well	Shallow/Intermediate	Y	Y	4/2/13	42	4	29.42	29.81	–	–	20	20
4	S-370				219838.794	2683832.630	Monitoring Well	Shallow/Intermediate	Y	Y	4/22/13	26	4	12.06	9.56	–	–	10	15
4	S-371				219749.715	2684294.869	Monitoring Well	Shallow/Intermediate	Y	Y	4/1/13	30	4	22.05	19.50	–	–	15	15
4	S-372				219317.034	2683823.872	Monitoring Well	Shallow/Intermediate	Y	Y	3/19/13	30	4	19.73	17.33	–	–	15	15
4	S-379				220886.524	2685665.992	Monitoring Well	Shallow/Intermediate	Y	Y	3/12/13	30	4	25.65	23.24	–	–	15	15
4	S-380				220595.994	2685673.673	Monitoring Well	Shallow/Intermediate	Y	Y	3/20/13	30	4	21.32	21.79	–	–	15	15
4	S-381				219563.419	2684589.820	Monitoring Well	Shallow/Intermediate	Y	Y	4/25/13	32	4	25.86	23.19	–	–	17	15

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

NOTES:

AOI - Area of Interest
ft. - feet
bgs - below ground surface
in. - inches
msl - elevation relative to mean sea level
g/cc - grams per cubic centimeter
NA - Data not available
*Product type percentage data not available

1. For wells that have not been surveyed by Langan, the pre-existing elevations (in NVGD 29) were converted to NAVD 88 (conversion factor is 1.05 ft).
2. Well construction details were taken directly from well boring logs provided by Handex, Secor, Aquaterra or collected from available historic reports. Where no well boring logs exist, no well construction or lithologic data is listed.
3. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.
4. Well classification based on the formation in which the well was screened in. Wells screened within the Middle Clay or the Farrington Sand were classified as deep wells.
   Well classification for wells screened above the Lower/Middle Clay were based on the following: screened in Fill/Alluvium - Shallow, screened in Trenton Gravel - Intermediate, screened in Fill/Alluvium & Trenton Gravel - Shallow/Intermediate
5. Product characterization data obtained from Sunoco's 2004 CCR and 2005 through 2013 Site Characterization Reports for AOIs 1 through 10.
6. For wells with no direct LNAPL density measurements, the density value in the nearest well with LNAPL data was used.

Table 2
Constituents of Concern
AOI 4
PES Facility
Philadelphia, Pennsylvania

METALS	CAS No.
Lead (dissolved)	7439-92-1

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

SVOCs/ PAHs	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 and the March 18, 2008 revised PADEP Petroleum Short List.

Table 3
Summary of Groundwater and LNAPL Elevations
AOI 4
June 2013
PES Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Specific Gravity (g/cc) Used for Correction		Depth to Product (ft. btic)	Depth to Groundwater (ft. BTIC)	Apparent LNAPL Thickness (feet)	LNAPL Elevation (ft amsl)	Groundwater Elevation (ft amsl)	Corrected Groundwater Elevation (ft amsl)	Top of Inner Casing (ft amsl)
				S.G.[1]	Source[2]							
AS-9	--	--	Piezometer			--	NG	--	--	--	--	19.51
MW-1	220728.9	2684127.4	Temporary Well Point Location			--	NG	--	--	--	--	16.38
MW-4	220715.37	2684313.635	Temporary Well Point Location			--	16.20	--	--	-1.33	--	14.87
RW-700	218992.6687	2684981.86	Recovery Well	0.8223	S-124	17.70	19.10	1.40	0.31	-1.09	0.06	18.01
RW-701	218971.5195	2684953.056	Recovery Well	0.8223	S-124	18.04	18.06	0.02	0.23	0.21	0.23	18.27
RW-702	218950.4725	2684925.809	Recovery Well			--	19.46	--	--	1.50	--	20.96
RW-703	218926.1254	2684901.345	Recovery Well			--	22.82	--	--	-2.20	--	20.62
RW-704	218910.9532	2684874.513	Recovery Well			--	27.52	--	--	-7.29	--	20.23
RW-705	218913.8966	2685079.941	Recovery Well			--	15.77	--	--	0.15	--	15.92
RW-706	218860.8822	2685031.985	Recovery Well			--	15.85	--	--	0.04	--	15.89
RW-707	218852.2628	2685021.555	Recovery Well			--	16.16	--	--	0.13	--	16.29
RW-708	218831.366	2685001.413	Recovery Well			--	15.35	--	--	0.14	--	15.49
RW-709	218811.7633	2684982.053	Recovery Well			--	15.75	--	--	-0.45	--	15.30
RW-710	218790.2503	2684962.881	Recovery Well			--	16.02	--	--	-0.14	--	15.88
RW-711	218782.5708	2684955.077	Recovery Well			--	18.19	--	--	-2.70	--	15.49
RW-712	218762.3803	2684936.126	Recovery Well			--	17.60	--	--	-2.04	--	15.56
RW-713	218748.0693	2684924.219	Recovery Well			--	16.31	--	--	-1.29	--	15.02
RW-714	218727.4099	2684903.449	Recovery Well			--	18.10	--	--	-2.89	--	15.21
RW-715	218705.8058	2684883.428	Recovery Well			--	17.66	--	--	-2.29	--	15.37
RW-716	218684.6699	2684863.323	Recovery Well			--	15.38	--	--	0.16	--	15.54
RW-717	218663.7362	2684843.635	Recovery Well			--	15.39	--	--	0.22	--	15.61
S-26	218758.26	2684615.95	Monitoring Well			--	20.56	--	--	0.20	--	20.76
S-27	219121.695	2684393.051	Monitoring Well			--	NG	--	--	--	--	24.61
S-28	219583.4	2684391.35	Monitoring Well			--	21.60	--	--	4.14	--	25.74
S-29	219694.79	2684380.2	Monitoring Well	0.855	S-29	21.11	22.60	1.49	2.19	0.70	1.97	23.30
S-30	219702.61	2684379.56	Recovery Well - Active	0.855	S-29	22.36	27.00	4.64	0.77	-3.87	0.10	23.13
S-31	219592.262	2684202.251	Monitoring Well			--	DRY	--	--	--	--	21.30
S-32	219917.06	2684135.82	Monitoring Well	0.8665	S-32	23.90	24.15	0.25	0.30	0.05	0.27	24.20
S-34	220356.691	2684176.992	Monitoring Well			--	21.08	--	--	-0.19	--	20.89
S-35	220363.967	2684236.72	Monitoring Well	0.8665	S-35	21.08	21.80	0.72	-0.14	-0.86	-0.24	20.94
S-36	220366.09	2684276.1	Monitoring Well			--	24.33	--	--	-0.10	--	24.23
S-38	219183.83	2685232.49	Monitoring Well			--	18.80	--	--	0.15	--	18.95
S-39	220133.11	2685582.26	Monitoring Well			--	22.57	--	--	0.31	--	22.88

Notes:

1. Specific Gravity (S.G.) values were determined from LNAPL samples taken by Aquaterra on February 27th and March 1st, 2004, or from samples collected by SECOR in 1999-2000.. Values for S-365 and S-369 were determined form LNAPL samples taken by Aquaterra in June 2013.
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 Aquaterra June 2013.

g/cc - Grams per cubic centimeter
ft btic - Feet below top of inner casing
ft amsl - Feet above mean sea level
TIC - Top of inner casing
LNAPL - Light non aqueous phase liquid
NG - Not gauged
Location not Gauged

Table 3
Summary of Groundwater and LNAPL Elevations
AOI 4
June 2013
PES Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Specific Gravity (g/cc) Used for Correction		Depth to Product (ft. btic)	Depth to Groundwater (ft. BTIC)	Apparent LNAPL Thickness (feet)	LNAPL Elevation (ft amsl)	Groundwater Elevation (ft amsl)	Corrected Groundwater Elevation (ft amsl)	Top of Inner Casing (ft amsl)
				S.G.[1]	Source[2]							
S-40	220733.63	2685637.31	Monitoring Well			--	NG	--	--	--	--	24.46
S-56	220723.49	2684592.77	Monitoring Well			--	14.80	--	--	0.20	--	15.00
S-57	220382.65	2683745.49	Monitoring Well			--	12.43	--	--	0.07	--	12.50
S-58	--	--	Recovery Well - Inactive			--	NG	--	--	--	--	--
S-67	--	--	Monitoring Well			--	NG	--	--	--	--	--
S-96	220718.53	2684857.12	Monitoring Well			--	19.77	--	--	0.00	--	19.77
S-97	219546.08	2684857.01	Monitoring Well			--	27.87	--	--	0.50	--	28.37
S-102	221406.75	2683873.83	Monitoring Well			--	18.28	--	--	-0.06	--	18.22
S-103	221274.57	2684427.94	Monitoring Well	0.7978	S-103	25.90	26.10	0.20	0.21	0.01	0.17	26.11
S-104	221448.27	2684803.51	Monitoring Well	0.8787	S-104	17.63	19.10	1.47	0.93	-0.54	0.75	18.56
S-119	220752.86	2685393.24	Monitoring Well			--	26.58	--	--	0.02	--	26.60
S-120	220402.98	2685596.68	Monitoring Well			--	19.52	--	--	0.30	--	19.82
S-121	220221.94	2685120.47	Monitoring Well			--	20.80	--	--	0.32	--	21.12
S-122	219646.6	2685442.91	Monitoring Well			--	25.44	--	--	0.27	--	25.71
S-123	219320.35	2684990.32	Monitoring Well	0.8653	S-97	25.96	26.00	0.04	-3.83	-3.87	-3.84	22.13
S-124	218884.83	2685003.67	Monitoring Well	0.8223	S-124	22.89	23.80	0.91	0.31	-0.60	0.15	23.20
S-216	220866.96	2684617.94	Monitoring Well			--	15.50	--	--	0.26	--	15.76
S-218	220121.84	2684500.98	Monitoring Well			--	25.35	--	--	0.39	--	25.74
S-219	219892	2684850.33	Monitoring Well			--	22.88	--	--	0.21	--	23.09
S-220	219151.9	2684262.28	Monitoring Well	0.855	S-29	21.40	22.25	0.85	-0.59	-1.44	-0.71	20.81
S-221	219006.13	2684933.43	Monitoring Well	0.8223	S-124	22.51	23.25	0.74	0.49	-0.25	0.36	23.00
S-222	218676.906	2684861.776	Monitoring Well			--	15.57	--	--	0.72	--	16.29
S-223	218858.534	2685063.585	Monitoring Well			--	15.61	--	--	0.27	--	15.88
S-224	218991.351	2685158.159	Monitoring Well			--	15.80	--	--	0.23	--	16.03
S-225	221122.91	2684548.85	Monitoring Well			--	16.50	--	--	0.36	--	16.86
S-229	220933.27	2683981.01	Monitoring Well			--	NG	--	--	--	--	22.73
S-233	218922.835	2684873.793	Monitoring Well	0.8223	S-124	20.97	22.25	1.28	3.38	2.10	3.15	24.35
S-234	218761.786	2684898.54	Monitoring Well			--	21.36	--	--	-0.13	--	21.23
S-234	218761.786	2684898.54	Monitoring Well			--	21.36	--	--	-0.13	--	21.23
S-235	218843.84	2684961.527	Monitoring Well	0.8223	S-124	22.69	23.81	1.12	0.44	-0.68	0.24	23.13
S-236	219018.432	2684953.845	Monitoring Well	0.8223	S-124	22.61	24.15	1.54	0.36	-1.18	0.09	22.97
S-237	218984.401	2684943.306	Monitoring Well	0.8223	S-124	22.40	24.20	1.80	0.42	-1.39	0.10	22.82
S-238	218916.689	2685034.493	Monitoring Well	0.8223	S-124	22.71	22.96	0.25	0.20	-0.05	0.16	22.92
S-239	218788.677	2684997.324	Monitoring Well			--	15.65	--	--	0.17	--	15.82

Notes:
1. Specific Gravity (S.G.) values were determined from LNAPL samples taken by Aquaterra on February 27th and March 1st, 2004, or from samples collected by SECOR in 1999-2000.. Values for S-365 and S-369 were determined form LNAPL samples taken by Aquaterra in June 2013.
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 Aquaterra June 2013.
g/cc - Grams per cubic centimeter
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ft amsl - Feet above mean sea level
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LNAPL - Light non aqueous phase liquid
NG - Not gauged
Location not Gauged

Table 3
Summary of Groundwater and LNAPL Elevations
AOI 4
June 2013
PES Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Specific Gravity (g/cc) Used for Correction		Depth to Product (ft. btic)	Depth to Groundwater (ft. BTIC)	Apparent LNAPL Thickness (feet)	LNAPL Elevation (ft amsl)	Groundwater Elevation (ft amsl)	Corrected Groundwater Elevation (ft amsl)	Top of Inner Casing (ft amsl)
				S.G.[1]	Source[2]							
S-240	218980.39	2684848.14	Monitoring Well	0.8223	S-124	23.55	25.50	1.95	0.31	-1.64	-0.03	23.86
S-241	219044.987	2684818.765	Monitoring Well	0.8223	S-124	25.80	28.35	2.55	0.28	-2.27	-0.17	26.08
S-242	218813.239	2684857.203	Monitoring Well			--	21.74	--	--	0.15	--	21.89
S-243	218722.241	2684934.273	Monitoring Well			--	15.38	--	--	0.36	--	15.74
S-244	219110.021	2685081.871	Monitoring Well			--	24.71	--	--	-2.77	--	21.94
S-245	219051.042	2684999.415	Monitoring Well			--	21.94	--	--	0.27	--	22.21
S-246	219005.316	2685017.554	Monitoring Well			--	20.80	--	--	0.76	--	21.56
S-278	218752.79	2684809.98	Monitoring Well	0.8223	S-124	20.65	21.61	0.96	0.38	-0.58	0.21	21.03
S-279	219165.69	2684701.46	Monitoring Well	0.8223	S-124	25.95	26.00	0.05	0.50	0.45	0.49	26.45
S-282	220826.502	2683959.5	Monitoring Well	0.8158	S-365	21.85	22.80	0.95	-1.06	-2.01	-1.24	20.79
S-329	218689.633	2684779.003	Monitoring Well			--	22.95	--	--	-2.03	--	20.92
S-364	221075.221	2683860.865	Monitoring Well			--	21.67	--	--	-0.34	--	21.33
S-365	220854.649	2683838.836	Monitoring Well	0.8158	S-365	20.95	21.05	0.10	-0.20	-0.30	-0.22	20.75
S-366	221391.626	2684586.165	Monitoring Well			--	22.45	--	--	-0.20	--	22.26
S-367	221273.785	2684688.494	Monitoring Well			--	16.05	--	--	-0.03	--	16.02
S-368	221485.158	2684900.542	Monitoring Well			--	17.61	--	--	0.41	--	18.02
S-369	221204.234	2685725.712	Monitoring Well	0.8787	S-104	30.06	30.09	0.03	-0.64	-0.67	-0.64	29.42
S-370	219838.794	2683832.63	Monitoring Well			--	12.31	--	--	-0.25	--	12.06
S-371	219749.715	2684294.869	Monitoring Well			--	20.57	--	--	1.48	--	22.05
S-372	219317.034	2683823.872	Monitoring Well			--	19.55	--	--	0.18	--	19.73
S-379	220886.524	2685665.992	Monitoring Well			--	25.90	--	--	-0.25	--	25.65
S-380	220595.994	2685673.673	Monitoring Well			--	21.25	--	--	0.07	--	21.32
S-381	219563.419	2684589.82	Monitoring Well			--	25.90	--	--	-0.04	--	25.86

Notes:
1. Specific Gravity (S.G.) values were determined from LNAPL samples taken by Aquaterra on February 27th and March 1st, 2004, or from samples collected by SECOR in 1999-2000.. Values for S-365 and S-369 were determined form LNAPL samples taken by Aquaterra in June 2013.
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 Aquaterra June 2013.
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ft amsl - Feet above mean sea level
TIC - Top of inner casing
LNAPL - Light non aqueous phase liquid
NG - Not gauged
Location not Gauged

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-SURFACE				PB-880-1				PB-880-2				PB-880-3				PB-880-4			
							Sample ID	880-SURFACE_04/08/2004				880-1_04/08/2004				880-2_04/08/2004				880-3_04/08/2004				880-4_04/08/2004			
							Sample Date	4/8/2004				4/8/2004				4/8/2004				4/8/2004				4/8/2004			
							Sample Interval (ft)	Unknown				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	**36**		0.0005	472.59	0.42		0.0005	17.28	ND	U	0.0005	20	ND	U	0.0005	21.95	0.14		0.0005	21.48
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	41		0.001	472.59	1		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	0.66		0.001	21.48
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	13		0.001	472.59	0.35		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	0.27		0.001	21.48
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	**140**		0.001	472.59	2.7		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	1.3		0.001	21.48
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	3.6	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.88	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	2.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	12		0.033	1	0.46	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.34	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	**52**		0.001	472.59	2		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	1.1		0.001	21.48
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	28		0.033	1	0.86	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.59	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	3.1	J	0.033	1	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC

10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL

10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC

10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-5				PB-880-6				PB-880-7				PB-880-8				PB-880-9			
							Sample ID	880-5_04/08/2004				880-6_04/08/2004				880-7_04/08/2004				880-8_04/08/2004				880-9_04/24/2004			
							Sample Date	4/8/2004				4/8/2004				4/8/2004				4/8/2004				4/24/2004			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.22		0.0005	22.52	ND	U	0.0005	20.76	0.018	J	0.0005	20.16	**0.58**		0.0005	22.67	**3.1**		0.0005	43.18
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.3		0.001	22.52	ND	U	0.001	20.76	ND	U	0.001	20.16	1.2		0.001	22.67	13		0.001	43.18
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.49		0.001	22.52	ND	U	0.001	20.76	ND	U	0.001	20.16	0.39		0.001	22.67	4.6		0.001	43.18
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	2.4		0.001	22.52	0.034	J	0.001	20.76	0.03	J	0.001	20.16	3.2		0.001	22.67	29		0.001	215.89
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.22	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.74	J	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.16	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.52	J	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.17	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.59	J	0.033	1	ND	U	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.68	J	0.033	1	ND	U	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1	J	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.57		0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.9	J	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	2.1		0.001	22.52	ND	U	0.001	20.76	0.038	J	0.001	20.16	1.4		0.001	22.67	22		0.001	215.89
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	4.1	J	0.033	1	4.1	J	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.36	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.3	J	0.033	1	ND	U	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-10				PB-880-11				PB-880-12				PB-880-13				PB-881-1			
							Sample ID	880-10_04/24/2004				880-11_04/24/2004				880-12_04/24/2004				880-13_04/24/2004				881-1_07/22/2004			
							Sample Date	4/24/2004				4/24/2004				4/24/2004				4/24/2004				7/22/2004			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.33		0.0005	45.96	**1.1**		0.0005	48.08	0.034	J	0.0005	45.87	**8**		0.0005	47.8	ND	U	0.002	13
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.72		0.001	45.96	6.3		0.001	48.08	0.15	J	0.001	45.87	3.3		0.001	47.8	ND	U	0.002	13
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.3		0.001	45.96	2.7		0.001	48.08	0.069	J	0.001	45.87	1.6		0.001	47.8	ND	U	0.005	13
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	1.7		0.001	45.96	12		0.001	48.08	0.26	J	0.001	45.87	24		0.001	191.2	0.0024	J	0.002	13
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.019		0.0006	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.077		0.0013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.091		0.002	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.067		0.0027	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.12		0.0027	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.075		0.002	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	1.4	J	0.033	5	2.8	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.0057	J	0.004	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.043		0.0033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	1.3		0.001	45.96	13		0.001	48.08	0.41		0.001	45.87	10		0.001	47.8	ND	U	0.01	13
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.3	J	0.033	5	5.9	J	0.033	5	ND	U	0.033	5	2	J	0.033	5	0.096		0.002	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.21		0.0047	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

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UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC

10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL

10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC

10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-2				PB-881-3				PB-881-4				PB-881-5				PB-881-6			
							Sample ID	881-2_07/22/2004				881-3_07/22/2004				881-4_07/22/2004				881-5_07/22/2004				881-6_07/22/2004			
							Sample Date	7/22/2004				7/22/2004				7/22/2004				7/22/2004				7/22/2004			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.011		0.002	11	ND	U	0.002	222	ND	U	0.002	12	ND	U	0.002	2103	ND	U	0.002	3788
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.023		0.002	11	0.3		0.002	222	ND	U	0.002	12	ND	U	0.002	2103	ND	U	0.002	3788
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.084		0.005	11	0.85		0.005	222	ND	U	0.005	12	5.8		0.005	2103	ND	U	0.005	3788
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.032		0.002	11	0.25		0.002	222	0.0027	J	0.002	12	1.7		0.002	2103	ND	U	0.002	3788
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.057		0.0006	5	0.17	J	0.0006	5	ND	U	0.0006	5	0.89		0.0006	5	0.36	J	0.0006	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.018	J	0.0013	5	ND	U	0.0013	5	0.078	J	0.0013	5	ND	U	0.0013	5	ND	U	0.0013	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.021	J	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.019	J	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.065	J	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.069	J	0.004	5	0.24	J	0.004	5	ND	U	0.004	5	1.8	J	0.004	5	ND	U	0.004	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	11	3.4		0.01	222	0.013		0.01	12	**31**		0.01	2103	20		0.01	3788
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.25		0.002	5	0.61	J	0.002	5	ND	U	0.002	5	4.2		0.002	5	0.66	J	0.002	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.12	J	0.0047	5	0.39	J	0.0047	5	ND	U	0.0047	5	1.6	J	0.0047	5	0.92	J	0.0047	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.
B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-7				PB-826-1				PB-826-2				PB-826-3				PB-826-4			
							Sample ID	881-7_07/22/2004				826-1_09/07/2004				826-2_09/07/2004				826-3_09/07/2004				826-4_09/07/2004			
							Sample Date	7/22/2004				9/7/2004				9/7/2004				9/7/2004				9/7/2004			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	2439	ND	U	0.002	21	ND	U	0.002	21	ND	U	0.002	21	ND	U	0.002	21
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	2439	ND	U	0.002	21	0.0025	J	0.002	21	0.0022	J	0.002	21	ND	U	0.002	21
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.9		0.005	2439	ND	U	0.005	21	ND	U	0.005	21	ND	U	0.005	21	ND	U	0.005	21
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.33	J	0.002	2439	0.0027	J	0.002	21	0.0054		0.002	21	0.0043	J	0.002	21	ND	U	0.002	21
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.24	J	0.0006	5	0.068		0.0006	5	0.23		0.0006	5	0.023	J	0.0006	5	0.016		0.0006	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.0013	5	0.24		0.0013	5	0.88		0.0013	20	0.11		0.0013	5	0.083		0.0013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.002	5	0.25		0.002	5	0.8		0.002	20	0.16		0.002	5	0.1		0.002	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.0027	5	0.21		0.0027	5	0.71		0.0027	20	0.13		0.0027	5	0.086		0.0027	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.0027	5	0.42		0.0027	5	1		0.0027	5	0.28		0.0027	5	0.17		0.0027	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.002	5	0.23		0.002	5	0.82		0.002	5	0.13		0.002	5	0.089		0.002	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.49	J	0.004	5	0.033	J	0.004	5	0.11	J	0.004	5	ND	U	0.004	5	0.012	J	0.004	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.0033	5	0.097		0.0033	5	0.5		0.0033	5	0.071	J	0.0033	5	0.046		0.0033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	18		0.01	2439	ND	U	0.01	21	0.016	J	0.01	21	0.015	J	0.01	21	ND	U	0.01	21
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.1		0.002	5	0.39		0.002	5	1.5		0.002	5	0.15		0.002	5	0.12		0.002	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.54	J	0.0047	5	0.78		0.0047	5	2.4		0.0047	5	0.44		0.0047	5	0.25		0.0047	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

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UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
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AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-826-5				PB-826-6				PB-826-7				PB-826-8				PB-880-14			
							Sample ID	826-5_09/07/2004				826-6_09/07/2004				826-7_09/07/2004				826-8_09/07/2004				880-14_09/07/2004			
							Sample Date	9/7/2004				9/7/2004				9/7/2004				9/7/2004				9/7/2004			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	21	ND	U	0.002	22	ND	U	0.002	22	ND	U	0.002	23	0.014		0.002	22
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	21	ND	U	0.002	22	ND	U	0.002	22	0.0048	J	0.002	23	ND	U	0.002	22
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	21	ND	U	0.005	22	ND	U	0.005	22	ND	U	0.005	23	0.031		0.005	22
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.0027	J	0.002	21	ND	U	0.002	22	ND	U	0.002	22	0.0081		0.002	23	0.037		0.002	22
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.0056	J	0.0006	1	0.00085	J	0.0006	1	ND	U	0.0006	1	0.023	J	0.0006	5	0.021	J	0.0006	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.027		0.0013	1	0.0056	J	0.0013	1	0.0041	J	0.0013	1	0.11		0.0013	5	0.063		0.0013	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.032		0.002	1	0.0085	J	0.002	1	0.0061	J	0.002	1	0.11		0.002	5	0.099		0.002	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.027		0.0027	1	0.0069	J	0.0027	1	0.0048	J	0.0027	1	0.11		0.0027	5	0.085		0.0027	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.052		0.0027	1	0.013	J	0.0027	1	0.011	J	0.0027	1	0.17		0.0027	5	0.1		0.0027	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.028		0.002	1	0.0064	J	0.002	1	0.0053	J	0.002	1	0.098		0.002	5	0.085		0.002	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.004	1	ND	U	0.004	1	ND	U	0.004	1	ND	U	0.004	5	0.026	J	0.004	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.024		0.0033	1	0.004	J	0.0033	1	ND	U	0.0033	1	0.06	J	0.0033	5	ND	U	0.0033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	21	ND	U	0.01	22	ND	U	0.01	22	ND	U	0.01	23	0.22		0.01	22
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.031		0.002	1	0.0059	J	0.002	1	0.0051	J	0.002	1	0.13		0.002	5	0.16		0.002	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.076		0.0047	1	0.017	J	0.0047	1	0.014	J	0.0047	1	0.28		0.0047	5	0.19		0.0047	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

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CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-826-9				S-219				S-221				S-229				S-216			
							Sample ID	826-9_09/07/2004				BH-S219-032505-1-1.5				BH-S221-032505-1.5-2				BH-S229-032505-1.5-2				BH-S216-032505-1-1.5			
							Sample Date	9/7/2004				3/25/2005				3/25/2005				3/25/2005				3/25/2005			
							Sample Interval (ft)	0-0.5				1-1.5				1.5-2				1.5-2				1-1.5			
							Sample Purpose	Tank Closure				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	22	ND	U	0.0004	0.85	ND	U	0.0004	0.83	ND	U	0.0004	0.81	ND	U	0.0004	0.83
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	22	ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	22	ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				ND	U	0.0004	0.85	ND	U	0.0004	0.83	0.014		0.0004	0.81	ND	U	0.0004	0.83
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.0036	J	0.002	22	ND	U	0.0008	0.85	ND	U	0.0008	0.83	ND	U	0.0008	0.81	ND	U	0.0008	0.83
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.025		0.0006	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.048		0.0013	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.047		0.002	1	ND	U	0.033	1	0.46		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.047		0.0027	1	ND	U	0.033	1	0.56		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.068		0.0027	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.074		0.002	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.021	J	0.004	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.02		0.0033	1																
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	22	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.18		0.002	1	ND	U	0.033	1	0.39		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.17		0.0047	1	ND	U	0.033	1	0.53		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				8.99		0.921	1	102		0.921	1	16.7		0.903	1	60.8		0.921	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	S-119D				S-217				S-220				S-222				S-223			
							Sample ID	BHS119D-040105-1-1.5				BH-S217-040105-1-1.5				BH-S220-040105-1-1.5				BH-S222-080405-1-1.5				BH-S223-080405-1.5-2			
							Sample Date	4/1/2005				4/1/2005				4/1/2005				8/4/2005				8/4/2005			
							Sample Interval (ft)	1-1.5				1-1.5				1-1.5				1-1.5				1.5-2.0			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	**0.006**	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	0.006	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.005	1	ND	U	0.0004	0.78	ND	U	0.0004	0.83	ND	U	0.005	1	ND	U	0.006	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	0.006	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	0.006	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	0.006	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.005	1	ND	U	0.0004	0.78	ND	U	0.0004	0.83	ND	U	0.005	1	ND	U	0.006	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.005	1	ND	U	0.0008	0.78	ND	U	0.0008	0.83	ND	U	0.005	1	ND	U	0.006	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	0.46		0.033	1	ND	U	0.19	1	ND	U	0.23	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.38	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.19	1	ND	U	0.23	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	24.9		2.24	1	10.2		0.93	1	7.58		0.903	1	143		2.21	1	18.2		2.73	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	S-224				PB-881-1				PB-881-2				PB-881-3				PB-881-4			
							Sample ID	BH-S224-080405-1-1.5				881-1_10/26/2005				881-2_10/26/2005				881-3_10/26/2005				881-4_10/26/2005			
							Sample Date	8/4/2005				10/26/2005				10/26/2005				10/26/2005				10/26/2005			
							Sample Interval (ft)	1-1.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Site Characterization				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.005	1	NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.005	1	NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.005	1	ND	U	0.0005	41.19	ND	U	0.0005	47.89	ND	U	0.0005	43.55	ND	U	0.0005	43.25
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.005	1	NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.005	1	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	1	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.005	1	NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.005	1	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.19	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.49		0.19	1	0.2		0.033	1	0.046	J	0.033	1	ND	U	0.033	1	0.058	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.55		0.19	1	ND	U	0.033	1	0.06	J	0.033	1	ND	U	0.033	1	0.049	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.7		0.19	1	ND	U	0.033	1	0.042	J	0.033	1	ND	U	0.033	1	0.047	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.43		0.19	1	ND	U	0.033	1	0.065	J	0.033	1	0.057	J	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.49		0.19	1	0.15	J	0.033	1	0.14	J	0.033	1	ND	U	0.033	1	0.087	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.19	1	0.069	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				ND	U	0.033	1	ND	U	0.033	1	0.052	J	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.19	1	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	300		0.19	1	0.13	J	0.033	1	0.058	J	0.033	1	ND	U	0.033	1	0.059	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	900		0.19	1	0.11	J	0.033	1	0.1	J	0.033	1	0.054	J	0.033	1	0.098	J	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	192		2.24	1	NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.
B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-5				PB-881-6				PB-843 LINE 7				PB-843 LINE 8				PB-843 LINE 9			
							Sample ID	881-5_10/26/2005				881-6_10/26/2005				843 LINE 7_08/23/2006				843 LINE 8_08/23/2006				843 LINE 9_08/23/2006			
							Sample Date	10/26/2005				10/26/2005				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	44.25	ND	U	0.0005	40	ND	U	0.0005	44.52	ND	U	0.0005	50.05	0.035	J	0.0005	46.69
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	0.044	J	0.033	1	0.31		0.033	1	0.34	J	0.033	1	0.087	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.05	J	0.033	1	0.058	J	0.033	1	0.34		0.033	1	0.4	J	0.033	1	0.065	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.061	J	0.033	1	0.057	J	0.033	1	0.49		0.033	1	0.62	J	0.033	1	0.099	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.053	J	0.033	1	0.078	J	0.033	1	0.28		0.033	1	0.57	J	0.033	1	0.085	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.051	J	0.033	1	0.064	J	0.033	1	0.41		0.033	1	0.47	J	0.033	1	0.11	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	0.042	J	0.033	1	0.3		0.033	1	0.4	J	0.033	1	0.054	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.14	J	0.033	1	0.26	J	0.033	1	0.16	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.081	J	0.033	1	0.082	J	0.033	1	0.49		0.033	1	0.53	J	0.033	1	0.17	J	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-848 LINE 3				PB-848 LINE 1				PB-848 LINE 2				PB-847-AST-847-1				PB-847-AST-847-2			
							Sample ID	848 LINE 3_08/24/2006				848 LINE 1_08/24/2006				848 LINE 2_08/24/2006				AST-847-1/0-0.5_10/16/2006				AST-847-2/0-0.5_10/16/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				10/16/2006				10/16/2006			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	46.17	ND	U	0.0005	47.66	ND	U	0.0005	49.36	ND	U	0.0005	51.33	ND	U	0.0005	49.36
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				ND	U	0.001	51.33	ND	U	0.001	49.36
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.061	J	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.075	J	0.033	1	ND	U	0.033	1	0.17	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	0.23	J	0.033	1	0.058	J	0.033	1	ND	U	0.033	1	0.18	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.067	J	0.033	1	0.046	J	0.033	1	0.16	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.059	J	0.033	1	ND	U	0.033	1	0.091	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	1	0.36	J	0.033	1	0.083	J	0.033	1	0.079	J	0.033	1	0.13	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.044	J	0.033	1	ND	U	0.033	1	0.091	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.071	J	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.048	J	0.033	1	0.043	J	0.033	1	0.3		0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.042	J	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	0.05	J	0.033	1	0.31		0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				268		0.44	1	185		0.44	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-847-AST-847-3				PB-847-AST-847-4				PB-847-AST-847-5				PB-847-AST-847-6				PB-885-AST-885-SS-4			
							Sample ID	AST-847-3/0-0.5_10/16/2006				AST-847-4/0-0.5_10/16/2006				AST-847-5/0-0.5_10/16/2006				AST-847-6/0-0.5_10/16/2006				AST-885-SS-4_11/30/2006			
							Sample Date	10/16/2006				10/16/2006				10/16/2006				10/16/2006				11/30/2006			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.62	ND	U	0.0005	48.12	ND	U	0.0005	48.4	ND	U	0.0005	47.48	0.068	J	0.0005	48.45
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	4.4		0.001	48.45
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	ND	U	0.001	48.45
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	ND	U	0.001	48.45
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	0.1	J	0.001	48.45
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.043	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.048	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	0.063	J	0.001	47.48	0.11	J	0.001	48.45
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.081	J	0.033	1	ND	U	0.033	1	0.5	J	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.085	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	177		0.44	1	35.1		0.44	1	154		0.44	1	15.8		0.44	1	NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

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MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
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Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-SS-5				PB-885-AST-885-SS-6				PB-885-AST-885-SS-7				PB-885-AST-885-SS-3				PB-885-AST-885-SS-8			
							Sample ID	AST-885-SS-5_11/30/2006				AST-885-SS-6_11/30/2006				AST-885-SS-7_11/30/2006				AST-885-SS-3_11/30/2006				AST-885-SS-8_11/30/2006			
							Sample Date	11/30/2006				11/30/2006				11/30/2006				11/30/2006				11/30/2006			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.35		0.0005	51.55	**2.6**		0.0005	50.61	0.16	J	0.0005	51.76	ND	U	0.0005	56.56	ND	U	0.0005	57.01
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	27		0.001	51.55	97		0.001	506.07	66		0.001	517.6	ND	U	0.001	56.56	ND	U	0.001	57.01
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	3.4		0.001	51.55	13		0.001	50.61	2.4		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	1.7		0.001	51.55	5.4		0.001	50.61	2.9		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	3.3		0.001	51.55	26		0.001	506.07	3.4		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	0.22	J	0.033	5	0.076	J	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.069	J	0.033	1	0.22	J	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.075	J	0.033	1	0.24	J	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.046	J	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	0.22	J	0.033	5	0.077	J	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	5	1.2		0.033	5	1.2		0.033	5	ND	U	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.046	J	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	5.6		0.001	51.55	15		0.001	50.61	11		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.5		0.033	5	2		0.033	5	2.3		0.033	5	0.12	J	0.033	1	ND	U	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.092	J	0.033	1	0.24	J	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-SS-9				PB-885-AST-885-SS-10				PB-885-AST-885-SS-2				PB-885-AST-885-SS-1				PB-884-AST-884-SS-2			
							Sample ID	AST-885-SS-9_11/30/2006				AST-885-SS-10_11/30/2006				AST-885-SS-2_11/30/2006				AST-885-SS-1_11/30/2006				AST-884-SS-2_11/30/2006			
							Sample Date	11/30/2006				11/30/2006				11/30/2006				11/30/2006				11/30/2006			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	49.5	0.11	J	0.0005	53.82	0.1	J	0.0005	51.39	ND	U	0.0005	51.55	0.055	J	0.0005	48.54
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1.8		0.001	49.5	17		0.001	53.82	21		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	49.5	2.2		0.001	53.82	2.1		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.11	J	0.001	49.5	1.2		0.001	53.82	1.2		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	49.5	0.85		0.001	53.82	1.6		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.2	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.49	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.14	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.36	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.14	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.46	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.15	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.26	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.096	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.55	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.15	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.47	J	0.033	5	1.2		0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.3	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.1	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.55		0.001	49.5	6.5		0.001	53.82	4.8		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.4		0.033	5	2		0.033	5	0.88	J	0.033	5	ND	U	0.033	5	0.17	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.82	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.18	J	0.033	5	0.24		0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-884-AST-884-SS-1				AST-845-LINE-1				AST-845-LINE-2				AST-845-LINE-3				AST-845-LINE-4			
							Sample ID	AST-884-SS-1_11/30/2006				AST-845-LINE-1				AST-845-LINE-2				AST-845-LINE-3				AST-845-LINE-4			
							Sample Date	11/30/2006				3/14/2007				3/14/2007				3/14/2007				3/14/2007			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	6.4		0.001	48.97	ND	UD	0.097	50	0.077	JD	0.12	50	ND	UD	0.1	50	0.09	JD	0.12	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.74		0.001	48.97	ND	UD	0.097	50	0.068	JD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.49		0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.12	J	0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.045	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.073	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.081	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.088	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	0.47		0.4	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.058	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.1	J	0.033	1	ND	U	0.42	1	0.45		0.41	1	ND	U	0.39	1	ND	U	0.4	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.39		0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.047	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	2.7		0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.66		0.033	1	ND	U	0.42	1	0.64		0.41	1	ND	U	0.39	1	ND	U	0.4	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.11	J	0.033	1	ND	U	0.42	1	0.64		0.41	1	0.45		0.39	1	0.62		0.4	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

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UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
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Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AST-845-LINE-5				PB-885-AST-885-CS-1				PB-885-AST-885-CS-10				PB-885-AST-885-CS-11				PB-885-AST-885-CS-12			
							Sample ID	AST-845-LINE-5				AST-885-CS-1				AST-885-CS-10				AST-885-CS-11				AST-885-CS-12			
							Sample Date	3/14/2007				3/14/2007				3/14/2007				3/14/2007				3/14/2007			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.13	50	ND	UD	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	UD	0.13	50	2.1	D	0.096	50	0.15	D	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.13	50	0.11	D	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.13	50	0.054	JD	0.096	50	0.099	D	0.09	50	0.089	JD	0.095	50	ND	UD	0.094	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.13	50	ND	UD	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.49		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.53		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.49		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	UD	0.13	50	0.52	D	0.096	50	0.1	D	0.09	50	ND	UD	0.095	50	0.16	D	0.094	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.66		0.37	1	0.6		0.39	1	ND	U	0.4	1	ND	U	0.41	1	0.5		0.38	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	1		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.
B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-13				PB-885-AST-885-CS-14				PB-885-AST-885-CS-15				PB-885-AST-885-CS-2				PB-885-AST-885-CS-3			
							Sample ID	AST-885-CS-13				AST-885-CS-14				AST-885-CS-15				AST-885-CS-2				AST-885-CS-3			
							Sample Date	3/14/2007				3/14/2007				3/14/2007				3/14/2007				3/14/2007			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	**0.55**	D	0.083	50	0.065	JD	0.09	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1.9	D	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	7.9	D	0.083	50	18	D	0.09	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.6	D	0.083	50	0.44	D	0.09	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	0.44	D	0.083	50	0.48	D	0.09	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.05	JD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.1	D	0.083	50	0.61	D	0.09	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.45		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.76		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.46		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.68		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.56		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	0.49		0.41	1	3.3		0.38	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.48	D	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.4	D	0.083	50	4.1	D	0.09	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.38	1	ND	U	0.43	1	1.6		0.4	1	0.61		0.41	1	3.9		0.38	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	1.1		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
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AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-4				PB-885-AST-885-CS-5				PB-885-AST-885-CS-6				PB-885-AST-885-CS-7				PB-885-AST-885-CS-8			
							Sample ID	AST-885-CS-4				AST-885-CS-5				AST-885-CS-6				AST-885-CS-7				AST-885-CS-8			
							Sample Date	3/14/2007				3/14/2007				3/14/2007				3/14/2007				3/14/2007			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.19	D	0.081	50	0.11	D	0.095	50	ND	UD	0.092	50	ND	UD	0.1	50	ND	UD	0.11	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	21	D	0.081	50	22	D	0.095	50	0.81	D	0.092	50	7.3	D	0.1	50	3.1	D	0.11	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.7	D	0.081	50	1.8	D	0.095	50	ND	UD	0.092	50	0.51	D	0.1	50	0.34	D	0.11	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	1.1	D	0.081	50	1.1	D	0.095	50	ND	UD	0.092	50	0.35	D	0.1	50	0.25	D	0.11	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	3.4	D	0.081	50	3.3	D	0.095	50	ND	UD	0.092	50	0.23	D	0.1	50	0.1	JD	0.11	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	4.6	D	0.081	50	4.3	D	0.095	50	0.19	D	0.092	50	1.2	D	0.1	50	0.74	D	0.11	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.38	1	2.5		0.38	1	0.72		0.42	1	ND	U	0.41	1	1.9		0.45	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-9				PB-252-LINE-1				PB-252-LINE-2				PB-252-LINE-3				PB-849-LINE-1			
							Sample ID	AST-885-CS-9				PB-252-LINE-1				PB-252-LINE-2				PB-252-LINE-3				PB-849-LINE-1			
							Sample Date	3/14/2007				5/30/2007				5/30/2007				5/30/2007				9/4/2007			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1	D	0.11	50	NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.11	50	0.15	JD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.11	JD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.45	1	ND	U	0.36	1	ND	U	0.36	1	ND	U	0.37	1	ND	UD	3.7	10
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.21	D	0.11	50	ND	UD	0.28	50	0.17	JD	0.21	50	0.19	JD	0.22	50	0.0039	J	0.0056	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.45	1	ND	U	0.36	1	0.55		0.36	1	0.91		0.37	1	ND	UD	3.7	10
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-849-LINE-2				PB-849-LINE-3				PB-849-LINE-4				S-379				S-372			
							Sample ID	PB-849-LINE-2				PB-849-LINE-3				PB-849-LINE-4				S-379_0-2'				S-372_1-1.5'			
							Sample Date	9/4/2007				9/4/2007				9/4/2007				2/28/2013				2/28/2013			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-2				1-1.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				ND	U	0.00018	1	0.0004	J	0.0002	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				ND	U	0.00011	1	ND	U	0.00012	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				ND	U	0.00012	1	ND	U	0.00013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				ND	U	0.00014	1	ND	U	0.00015	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0061	1	0.0046	J	0.0061	1	ND	U	0.0058	1	ND	U	0.0001	1	ND	U	0.00011	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				ND	U	0.00012	1	ND	U	0.00013	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.0061	1	ND	U	0.0061	1	ND	U	0.0058	1	ND	U	0.00023	1	ND	U	0.00025	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.0061	1	ND	U	0.0061	1	ND	U	0.0058	1	ND	U	0.000066	1	ND	U	0.00007	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				ND	U	0.00021	1	ND	U	0.00022	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.0061	1	0.0047	J	0.0061	1	ND	U	0.0058	1	ND	U	0.000093	1	ND	U	0.000099	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.011	1	ND	U	0.011	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.011	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.013	1	ND	U	0.013	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.012	1	ND	U	0.012	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.011	1	ND	U	0.011	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.002	J	0.0061	1	0.0036	J	0.0061	1	0.002	J	0.0058	1	ND	U	0.0094	1	ND	U	0.0095	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.016	1	ND	U	0.016	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.013	1	ND	U	0.013	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				1.5	B	0.12	1	14.4		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	S-370				S-380				S-369				S-364				S-365			
							Sample ID	S-370-0-2				S-380_0-2'				S-369_0-2'				AOI4_S-364_.5-1_30413				S-365_0-2'			
							Sample Date	3/1/2013				3/1/2013				3/4/2013				3/4/2013				3/4/2013			
							Sample Interval (ft)	0-2				0-2				0-2				0.5-1				0-2			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00023	1	ND	U	0.00019	1	ND	U	0.00013	1	ND	U	0.00015	1	ND	U	0.00012	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00014	1	ND	U	0.00011	1	ND	U	0.000078	1	ND	U	0.000094	1	ND	U	0.00007	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00015	1	ND	U	0.00012	1	ND	U	0.000083	1	ND	U	0.0001	1	ND	U	0.000075	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00018	1	ND	U	0.00014	1	ND	U	0.000098	1	ND	U	0.00012	1	ND	U	0.000089	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00013	1	ND	U	0.00011	1	ND	U	0.000073	1	ND	U	0.000088	1	ND	U	0.000066	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00016	1	ND	U	0.00013	1	ND	U	0.000086	1	ND	U	0.0001	1	ND	U	0.000077	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00029	1	ND	U	0.00024	1	ND	U	0.00016	1	ND	U	0.00019	1	ND	U	0.00015	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000083	1	ND	U	0.000067	1	ND	U	0.000046	1	ND	U	0.000055	1	ND	U	0.000041	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00026	1	ND	U	0.00021	1	ND	U	0.00014	1	ND	U	0.00017	1	ND	U	0.00013	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00012	1	ND	U	0.000095	1	ND	U	0.000065	1	ND	U	0.000078	1	ND	U	0.000058	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.014	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.012	1	0.0178	J	0.012	1	ND	U	0.011	1	0.02	J	0.011	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	0.0242	J	0.01	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.014	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	0.035		0.011	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.015	1	ND	U	0.013	1	ND	U	0.014	1	ND	U	0.013	1	0.0292	J	0.012	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.014	1	ND	U	0.012	1	0.0182	J	0.013	1	ND	U	0.012	1	0.0279	J	0.011	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.011	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.011	1	ND	U	0.0097	1	ND	U	0.01	1	ND	U	0.0096	1	ND	U	0.0091	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.018	1	ND	U	0.016	1	ND	U	0.017	1	ND	U	0.016	1	ND	U	0.015	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.016	1	ND	U	0.014	1	0.026	J	0.014	1	0.0237	J	0.013	1	0.0295	J	0.013	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	9.9		0.14	1	24.3		0.13	1	10.5		0.13	1	13		0.13	1	79.1		0.12	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
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Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	S-371				S-367				S-366				S-368				AOI4-BH-13-97			
							Sample ID	AOI4_S-371_1-1.5_30413				S-367_0-2'				AOI4_S-366_0-1_30513				AOI4_S-368_0-1_30513				AOI4-BH-13-97.0-1_31413			
							Sample Date	3/4/2013				3/5/2013				3/5/2013				3/5/2013				3/14/2013			
							Sample Interval (ft)	1-1.5				0-2				0-1				0-1				0-1			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00021	1	0.00059	J	0.00012	1	ND	U	0.00019	1	ND	U	0.00022	1	ND	U	0.0002	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00007	1	ND	U	0.00011	1	ND	U	0.00013	1	ND	U	0.00012	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.000074	1	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.00013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	0.00027	J	0.000088	1	ND	U	0.00014	1	ND	U	0.00017	1	ND	U	0.00015	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.000066	1	ND	U	0.00011	1	ND	U	0.00012	1	ND	U	0.00011	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	0.005		0.000077	1	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.00013	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00027	1	0.00081		0.00014	1	ND	U	0.00024	1	ND	U	0.00027	1	ND	U	0.00025	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000075	1	0.0135		0.000041	1	ND	U	0.000067	1	ND	U	0.000077	1	ND	U	0.00007	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00013	1	ND	U	0.00021	1	ND	U	0.00024	1	ND	U	0.00022	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	0.00067		0.000058	1	ND	U	0.000094	1	ND	U	0.00011	1	ND	U	0.000099	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.013	1	0.209		0.013	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.04	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.0313	J	0.012	1	0.468		0.012	1	0.0154	J	0.011	1	0.0324	J	0.012	1	ND	U	0.045	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.0353	J	0.011	1	0.402		0.011	1	0.0169	J	0.011	1	0.0368		0.011	1	ND	U	0.027	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.0326	J	0.012	1	0.409		0.012	1	0.0177	J	0.012	1	0.0379		0.012	1	ND	U	0.028	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.0655		0.014	1	0.346		0.013	1	0.0212	J	0.013	1	0.0288	J	0.013	1	ND	U	0.053	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.039		0.013	1	0.729		0.012	1	0.0139	J	0.012	1	0.0358	J	0.012	1	ND	U	0.047	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.012	1	0.394		0.012	1	ND	U	0.011	1	ND	U	0.012	1	ND	U	0.041	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	1	ND	U	0.0098	1	ND	U	0.0095	1	ND	U	0.0098	1	ND	U	0.045	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.0298	J	0.017	1	0.839		0.016	1	ND	U	0.016	1	0.0205	J	0.016	1	ND	U	0.035	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.0404		0.014	1	1.04		0.014	1	ND	U	0.013	1	0.0401		0.014	1	ND	U	0.036	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	102		0.13	1	258		0.13	1	14.2		0.61	5	44.3		0.13	1	81.5		0.18	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-91				AOI4-BH-13-98				AOI4-BH-13-88				AOI4_BH-13-94				S-381			
							Sample ID	AOI4-BH-13-91_0-2'_031413				AOI4-BH-13-98-1-2_31413				AOI4-BH-13-88_1.5-2_31413				AOI-4_BH-13-94_0-2_031513				AOI4-S-381_0-.5_31513			
							Sample Date	3/14/2013				3/14/2013				3/14/2013				3/15/2013				3/15/2013			
							Sample Interval (ft)	0-2				1-2				1.5-2				0-2				0-0.5			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00018	1	ND	U	0.00021	1	13.6		0.023	1	ND	U	0.00021	1	ND	U	0.00022	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00011	1	ND	U	0.00013	1	ND	U	**0.014**	1	ND	U	0.00013	1	ND	U	0.00013	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.015	1	ND	U	0.00014	1	ND	U	0.00014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00014	1	ND	U	0.00016	1	ND	U	0.017	1	ND	U	0.00016	1	ND	U	0.00016	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0001	1	ND	U	0.00012	1	ND	U	0.013	1	ND	U	0.00012	1	ND	U	0.00012	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.015	1	ND	U	0.00014	1	ND	U	0.00014	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00023	1	ND	U	0.00027	1	ND	U	0.029	1	ND	U	0.00027	1	ND	U	0.00027	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000066	1	ND	U	0.000075	1	0.694		0.0081	1	ND	U	0.000076	1	ND	U	0.000077	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00021	1	ND	U	0.00024	1	ND	U	0.026	1	ND	U	0.00024	1	ND	U	0.00024	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000093	1	ND	U	0.00011	1	ND	U	0.011	1	ND	U	0.00011	1	ND	U	0.00011	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.039	1	ND	U	0.04	1	ND	U	0.042	1	ND	U	0.039	1	0.0439	J	0.041	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.043	1	0.105	J	0.045	1	ND	U	0.048	1	ND	U	0.044	1	0.143		0.046	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.026	1	0.0823	J	0.027	1	ND	U	0.029	1	0.0442	J	0.026	1	0.0854	J	0.027	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.13		0.027	1	0.189		0.028	1	ND	U	0.029	1	0.15		0.027	1	0.143		0.028	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.051	1	0.0753	J	0.053	1	ND	U	0.056	1	ND	U	0.051	1	0.0814	J	0.053	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.046	1	0.112	J	0.048	1	ND	U	0.05	1	ND	U	0.046	1	0.158		0.048	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.04	1	ND	U	0.041	1	ND	U	0.044	1	ND	U	0.04	1	ND	U	0.042	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.044	1	ND	U	0.046	1	2.53		0.048	1	ND	U	0.044	1	ND	U	0.046	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.034	1	0.0619	J	0.035	1	0.622		0.037	1	ND	U	0.034	1	0.598		0.036	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.034	1	0.201		0.036	1	0.0608	J	0.038	1	0.0604	J	0.035	1	0.381		0.036	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	60.8		0.18	1	136		0.18	1	10		0.2	1	43.8		0.18	1	**25800**		18	100

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.
B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-104				AOI4-BH-13-103				AOI4-BH-13-102			
							Sample ID	AOI4-BH-13-104_0-.5_31513				AOI4-BH-13-103_0-1_31813				AOI4-BH-13-102_0-1_31813			
							Sample Date	3/15/2013				3/18/2013				3/18/2013			
							Sample Interval (ft)	0-0.5				0-1				0-1			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																			
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00021	1	ND	U	0.00032	1	ND	U	0.00023	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00019	1	ND	U	0.00014	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00021	1	ND	U	0.00015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	ND	U	0.00024	1	ND	U	0.00018	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.00018	1	ND	U	0.00013	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	ND	U	0.00021	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00026	1	ND	U	0.0004	1	ND	U	0.00029	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000074	1	ND	U	0.00011	1	ND	U	0.000083	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00036	1	ND	U	0.00026	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.00016	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																			
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.041	1	0.0731		0.013	1	ND	U	0.013	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.046	1	0.0807		0.012	1	0.0292	J	0.012	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.028	1	0.0794		0.012	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.028	1	0.0607		0.013	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.054	1	0.111		0.014	1	ND	U	0.013	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.048	1	0.122		0.013	1	0.0338	J	0.012	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.042	1	ND	U	0.012	1	ND	U	0.012	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.046	1	0.0654		0.01	1	ND	U	0.0098	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.036	1	0.285		0.017	1	0.0401		0.016	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.036	1	0.261		0.015	1	0.0476		0.014	1
Metals																			
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	7		0.18	1	**3020**		0.14	1	**1620**		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC

10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL

10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC

10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 4
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-101				AOI4-BH-13-100				AOI4-BH-13-99			
							Sample ID	AOI4-BH-13-101_0-1_31813				AOI4-BH-13-100_0-1_31813				AOI4-BH-13-99_1.5-2_031813			
							Sample Date	3/18/2013				3/18/2013				3/18/2013			
							Sample Interval (ft)	0-1				0-1				1.5-2			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																			
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00021	1	ND	U	0.00018	1	ND	U	0.00024	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00011	1	ND	U	0.00015	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00016	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	ND	U	0.00014	1	ND	U	0.00019	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.0001	1	0.00024	J	0.00014	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00027	1	ND	U	0.00023	1	ND	U	0.00031	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000076	1	ND	U	0.000065	1	0.00071	J	0.000087	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00021	1	ND	U	0.00028	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.000092	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																			
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.0182	J	0.013	1	ND	U	0.013	1	0.0675		0.014	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.0559		0.012	1	0.0231	J	0.012	1	0.111		0.013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.0449		0.011	1	0.0243	J	0.011	1	0.157		0.012	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.0544		0.012	1	0.0303	J	0.013	1	0.109		0.013	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.0408		0.014	1	0.0274	J	0.014	1	0.215		0.014	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.0787		0.012	1	0.0263	J	0.013	1	0.145		0.013	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.013	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	1	ND	U	0.01	1	0.0334	J	0.011	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.104		0.017	1	0.0235	J	0.017	1	0.237		0.018	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.12		0.014	1	0.0297	J	0.014	1	0.196		0.015	1
Metals																			
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	**494**		0.14	1	399		0.13	1	**11600**		0.68	5

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

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NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 PERIMETER 4				PB-843 PERIMETER 3				PB-843 PERIMETER 2				PB-843 PERIMETER 5				PB-843 PERIMETER 6			
							Sample ID	843 PERIMETER 4_08/23/2006				843 PERIMETER 3_08/23/2006				843 PERIMETER 2_08/23/2006				843 PERIMETER 5_08/23/2006				843 PERIMETER 6_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	3-3.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.45	ND	U	0.0005	46.73	0.037	J	0.0005	46.77	ND	U	0.0005	44.09	ND	U	0.0005	42.23
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.6		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.86		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.51		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.64		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.23		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.77		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.28		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	2.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	1.5		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 PERIMETER 1				PB-843 SUB 2				PB-843 LINE 1				PB-843 LINE 2				PB-843 LINE 3			
							Sample ID	843 PERIMETER 1_08/23/2006				843 SUB 2_08/23/2006				843 LINE 1_08/23/2006				843 LINE 2_08/23/2006				843 LINE 3_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	3-3.5				5-5.5				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	52.52	ND	U	0.0005	43.4	ND	U	0.0005	49.02	ND	U	0.0005	46.13	ND	U	0.0005	43.71
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	0.11	J	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.14	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.067	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.086	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.39		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.8		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.31		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
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10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
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Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 LINE 4				PB-843 LINE 5				PB-843 LINE 6				PB-843 SUB 1				PB-843 SUB 3			
							Sample ID	843 LINE 4_08/23/2006				843 LINE 5_08/23/2006				843 LINE 6_08/23/2006				843 SUB 1_08/23/2006				843 SUB 3_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5-5.5				5-5.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	43.03	ND	U	0.0005	46.73	ND	U	0.0005	48.64	ND	U	0.0005	42.88	ND	U	0.0005	42.41
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	ND	U	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	1.4		0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	ND	U	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.13	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.23	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	0.067	J	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	2.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.37	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
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10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 10				PB-844 LINE 9				PB-844 PERIMETER 3				PB-844 LINE 6				PB-844 LINE 5			
							Sample ID	844 LINE 10_08/23/2006				844 LINE 9_08/23/2006				844 PERIMETER 3_08/23/2006				844 LINE 6_08/23/2006				844 LINE 5_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	5.5-6				5.5-6				3-3.5				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**2.4**		0.0005	178.41	0.035	J	0.0005	43.9	ND	U	0.0005	44.8	ND	U	0.0005	49.16	0.034	J	0.0005	47.04
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	8.3		0.001	178.41	0.22	J	0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	4.2		0.001	178.41	0.34		0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	178.41	ND	U	0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	4		0.033	1	ND	U	0.033	1	0.15	J	0.033	1	ND	U	0.033	1	0.078	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.54		0.033	1	0.17	J	0.033	1	0.53		0.033	1	ND	U	0.033	1	0.31		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.1	J	0.033	1	0.2		0.033	1	0.5		0.033	1	ND	U	0.033	1	0.31		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.066	J	0.033	1	0.19	J	0.033	1	0.53		0.033	1	ND	U	0.033	1	0.32		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.15	J	0.033	1	0.28		0.033	1	ND	U	0.033	1	0.17	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.56		0.033	1	0.45		0.033	1	0.49		0.033	1	ND	U	0.033	1	0.27		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	2.2		0.033	1	0.97		0.033	1	0.075	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.038	J	0.033	1	0.14	J	0.033	1	0.32		0.033	1	ND	U	0.033	1	0.16	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	12		0.001	178.41	0.95		0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.1		0.033	1	1.9		0.033	1	0.6		0.033	1	ND	U	0.033	1	0.23		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.43		0.033	1	0.32		0.033	1	0.66		0.033	1	ND	U	0.033	1	0.29		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 8				PB-844 LINE 7				PB-844 PERIMETER 2				PB-844 PERIMETER 1				PB-844 PERIMETER 6			
							Sample ID	844 LINE 8_08/23/2006				844 LINE 7_08/23/2006				844 PERIMETER 2_08/23/2006				844 PERIMETER 1_08/23/2006				844 PERIMETER 6_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	5.5-6				5.5-6				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.067	J	0.0005	44.96	ND	U	0.0005	48.59	ND	U	0.0005	49.7	ND	U	0.0005	45.45	ND	U	0.0005	46.9
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.25		0.033	1	0.17	J	0.033	1	0.32		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.11	J	0.033	1	0.057	J	0.033	1	0.64		0.033	1	0.57		0.033	1	0.78		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.11	J	0.033	1	0.054	J	0.033	1	0.51		0.033	1	0.68		0.033	1	0.69		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.13	J	0.033	1	0.054	J	0.033	1	0.56		0.033	1	0.72		0.033	1	0.87		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.082	J	0.033	1	ND	U	0.033	1	0.32		0.033	1	0.44		0.033	1	0.42		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.12	J	0.033	1	0.056	J	0.033	1	0.6		0.033	1	0.52		0.033	1	0.74		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	0.075	J	0.033	1	0.15	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.073	J	0.033	1	ND	U	0.033	1	0.35		0.033	1	0.54		0.033	1	0.49		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.076	J	0.033	1	0.056	J	0.033	1	0.71		0.033	1	0.55		0.033	1	1		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.14	J	0.033	1	0.069	J	0.033	1	0.9		0.033	1	0.62		0.033	1	1.1		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 PERIMETER 5				PB-844 LINE 3				PB-844 SUB 2				PB-844 SUB 3				PB-844 LINE 1			
							Sample ID	844 PERIMETER 5_08/23/2006				844 LINE 3_08/23/2006				844 SUB 2_08/23/2006				844 SUB 3_08/23/2006				844 LINE 1_08/23/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/23/2006			
							Sample Interval (ft)	3-3.5				5.5-6				5-5.5				5-5.5				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.13	ND	U	0.0005	46.9	ND	U	0.0005	46.43	0.095	J	0.0005	45.33	ND	U	0.0005	45.13
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.073	J	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	0.078	J	0.001	45.33	ND	U	0.001	45.13
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.48		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.078	J	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.11	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.11	J	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.068	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.089	J	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.093	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.097	J	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.13	J	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.15	J	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.048	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.088	J	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.18	J	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.38		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.17	J	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 2				PB-844 SUB 1				PB-844 PERIMETER 4				PB-844 LINE 4				PB-846 LINE 2			
							Sample ID	844 LINE 2_08/23/2006				844 SUB 1_08/23/2006				844 PERIMETER 4_08/23/2006				844 LINE 4_08/23/2006				846 LINE 2_08/24/2006			
							Sample Date	8/23/2006				8/23/2006				8/23/2006				8/23/2006				8/24/2006			
							Sample Interval (ft)	5.5-6				5-5.5				3-3.5				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.76	0.031	J	0.0005	44.01	0.38		0.0005	48.26	ND	U	0.0005	48.22	ND	U	0.0005	50.15
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.32		0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	ND	U	0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.52		0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	0.92		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	0.21		0.033	1	2.3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	1.8		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	0.15	J	0.033	1	2.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.073	J	0.033	1	1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	0.2		0.033	1	1.9		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	0.067	J	0.033	1	0.42		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	0.087	J	0.033	1	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.13	J	0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	0.52		0.033	1	3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	0.37		0.033	1	3		0.033	1	ND	U	0.033	1	0.045	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 LINE 1				PB-846 LINE 7				PB-846 LINE 4				PB-846 LINE 5				PB-846 LINE 6			
							Sample ID	846 LINE 1_08/24/2006				846 LINE 7_08/24/2006				846 LINE 4_08/24/2006				846 LINE 5_08/24/2006				846 LINE 6_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	48.26	0.029	J	0.0005	49.7	0.037	J	0.0005	54.59	0.22	J	0.0005	45.41	0.12	J	0.0005	48.78
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	ND	U	0.001	54.59	0.62		0.001	45.41	ND	U	0.001	48.78
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	0.16	J	0.001	54.59	0.29		0.001	45.41	ND	U	0.001	48.78
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	ND	U	0.001	54.59	0.12	J	0.001	45.41	0.1	J	0.001	48.78
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.038	J	0.033	1	0.22		0.033	1	0.12	J	0.033	1	0.16	J	0.033	1	0.24		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.066	J	0.033	1	0.58		0.033	1	0.1	J	0.033	1	0.38		0.033	1	0.37		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.05	J	0.033	1	0.49		0.033	1	0.038	J	0.033	1	0.32		0.033	1	0.2		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.063	J	0.033	1	0.65		0.033	1	0.061	J	0.033	1	0.43		0.033	1	0.3		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.34		0.033	1	ND	U	0.033	1	0.21		0.033	1	0.12	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.067	J	0.033	1	0.55		0.033	1	0.29		0.033	1	0.51		0.033	1	0.85		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	0.73		0.033	1	0.38		0.033	1	0.55		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	0.33		0.033	1	ND	U	0.033	1	0.2		0.033	1	0.096	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.14	J	0.001	48.26	0.1	J	0.001	49.7	0.14	J	0.001	54.59	0.76		0.001	45.41	0.062	J	0.001	48.78
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.12	J	0.033	1	0.73		0.033	1	1.9		0.033	1	1.6		0.033	1	1.4		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.12	J	0.033	1	1		0.033	1	0.3		0.033	1	0.68		0.033	1	0.88		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 PERIMETER 6				PB-846 PERIMETER 5				PB-846 PERIMETER 4				PB-846 PERIMETER 3				PB-846 PERIMETER 2			
							Sample ID	846 PERIMETER 6_08/24/2006				846 PERIMETER 5_08/24/2006				846 PERIMETER 4_08/24/2006				846 PERIMETER 3_08/24/2006				846 PERIMETER 2_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	3-3.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.12	J	0.0005	44.44	ND	U	0.0005	43.94	ND	U	0.0005	49.16	ND	U	0.0005	46.47	0.039	J	0.0005	44.52
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.063	J	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.063	J	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	2		0.033	1	ND	U	0.033	1	0.19	J	0.033	1	1.5		0.033	1	0.086	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	3.5		0.033	1	ND	U	0.033	1	1.3		0.033	1	3.9		0.033	1	0.17	J	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.4		0.033	1	ND	U	0.033	1	1.4		0.033	1	3.3		0.033	1	0.16	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	3.2		0.033	1	ND	U	0.033	1	1.8		0.033	1	4.4		0.033	1	0.26		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	ND	U	0.033	1	0.63		0.033	1	1.8		0.033	1	0.2		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	3.4		0.033	1	ND	U	0.033	1	1.1		0.033	1	3.6		0.033	1	0.28		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.7		0.033	1	ND	U	0.033	1	0.11	J	0.033	1	0.57		0.033	1	0.09	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	ND	U	0.033	1	0.73		0.033	1	1.9		0.033	1	0.13	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	1.1		0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	0.16	J	0.001	46.47	0.095	J	0.001	44.52
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	9.1		0.033	5	ND	U	0.033	1	0.69		0.033	1	4.9		0.033	5	0.3		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	7.2		0.033	5	ND	U	0.033	1	1.1		0.033	1	6.3		0.033	5	0.35		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 PERIMETER 1				PB-846 LINE 3				PB-846 SUB 1				PB-846 SUB 2				PB-846 SUB 3			
							Sample ID	846 PERIMETER 1_08/24/2006				846 LINE 3_08/24/2006				846 SUB 1_08/24/2006				846 SUB 2_08/24/2006				846 SUB 3_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	3-3.5				5.5-6				5-5.5				5-5.5				5-5.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**5**		0.0005	46.55	ND	U	0.0005	47.39	ND	U	0.0005	43.9	ND	U	0.0005	46	0.027	J	0.0005	44.29
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.8		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	6.5		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.28		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.6		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	3.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.8		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.6		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	2.9		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	3.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.6		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	2		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.7		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	4.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.1		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.8		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	2.3		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	0.16	J	0.001	44.29
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	9.3		0.033	5	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	6.2		0.033	3
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	4.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	6.4		0.033	3
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848 SUB 1				PB-848 PERIMETER 1				PB-848 PERIMETER 2				PB-848 LINE 6				PB-848 PERIMETER 3			
							Sample ID	848 SUB 1_08/24/2006				848 PERIMETER 1_08/24/2006				848 PERIMETER 2_08/24/2006				848 LINE 6_08/24/2006				848 PERIMETER 3_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	5-5.5				3-3.5				3-3.5				5.5-6				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	49.26	ND	U	0.0005	45.96	ND	U	0.0005	44.09	ND	U	0.0005	45.17	ND	U	0.0005	44.96
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	ND	U	0.001	44.96
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	0.81		0.001	45.17	0.15	J	0.001	44.96
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	ND	U	0.001	44.96
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.11	J	0.033	1	0.06	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.071	J	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.16	J	0.033	1	0.15	J	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.51		0.033	1	0.59		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	0.059	J	0.001	44.96
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.87		0.033	1	0.88		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.15	J	0.033	1	0.12	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848 LINE 7				PB-848 SUB 3				PB-848 PERIMETER 6				PB-848 SUB 2				PB-845 PERIMETER 1			
							Sample ID	848 LINE 7_08/24/2006				848 SUB 3_08/24/2006				848 PERIMETER 6_08/24/2006				848 SUB 2_08/24/2006				845 PERIMETER 1_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	5.5-6				5-5.5				3-3.5				5-5.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.1	J	0.0005	45.33	**20**		0.0005	469.92	ND	U	0.0005	48.03	ND	U	0.0005	44.37	ND	U	0.0005	47.8
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.26	J	0.001	45.33	46		0.001	469.92	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	4.6		0.001	45.33	8.9		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.33	1.5		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.35		0.033	1	0.21		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.16	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.14	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.044	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.05	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.067	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.056	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.53		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.068	J	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.3		0.033	1	2.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.059	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.33	4.9		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.1		0.033	1	1.9		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.44		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.057	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845 PERIMETER 2				PB-845 PERIMETER 3				PB-845 SUB 1				PB-845 PERIMETER 5				PB-845 PERIMETER 4			
							Sample ID	845 PERIMETER 2_08/24/2006				845 PERIMETER 3_08/24/2006				845 SUB 1_08/24/2006				845 PERIMETER 5_08/24/2006				845 PERIMETER 4_08/24/2006			
							Sample Date	8/24/2006				8/24/2006				8/24/2006				8/24/2006				8/24/2006			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.13	ND	U	0.0005	49.12	ND	U	0.0005	46.95	ND	U	0.0005	47.66	ND	U	0.0005	48.45
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	ND	U	0.001	47.66	ND	U	0.001	48.45
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	0.18	J	0.001	47.66	ND	U	0.001	48.45
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	ND	U	0.001	47.66	ND	U	0.001	48.45
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	1.2		0.033	1	0.43		0.033	1	0.4		0.033	1	ND	U	0.033	1	0.24		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	2.8		0.033	1	1.5		0.033	1	1.2		0.033	1	0.59	J	0.033	1	0.75		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.3		0.033	1	1.4		0.033	1	0.86		0.033	1	0.65	J	0.033	1	0.68		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	2.8		0.033	1	1.6		0.033	1	1.2		0.033	1	1.2		0.033	1	0.88		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	0.84		0.033	1	0.48		0.033	1	0.72	J	0.033	1	0.46		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	2.8		0.033	1	1.5		0.033	1	1.2		0.033	1	3.1		0.033	1	0.74		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.51		0.033	1	0.18	J	0.033	1	0.19	J	0.033	1	0.59	J	0.033	1	0.13	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	0.81		0.033	1	0.53		0.033	1	0.48	J	0.033	1	0.43		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.12	J	0.001	45.13	ND	U	0.001	49.12	0.067	J	0.001	46.95	1.2		0.001	47.66	ND	U	0.001	48.45
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.3		0.033	2	2		0.033	1	1.7		0.033	1	1.8		0.033	1	0.97		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	4.4		0.033	2	2.6		0.033	1	2.2		0.033	1	2		0.033	1	1.3		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:
[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:
U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845 SUB 3				PB-845 SUB 2				PB-849-PER1				PB-849-PER2				PB-849-PER3			
							Sample ID	845 SUB 3_08/24/2006				845 SUB 2_08/24/2006				PB-849-PER1				PB-849-PER2				PB-849-PER3			
							Sample Date	8/24/2006				8/24/2006				5/25/2007				5/25/2007				5/25/2007			
							Sample Interval (ft)	5-5.5				5-5.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.53	ND	U	0.0005	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.59		0.033	1	0.11	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.64		0.033	1	0.11	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.44		0.033	1	0.085	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.65		0.033	1	0.12	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.25		0.033	1	0.051	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.66		0.033	1	0.14	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.52		0.033	1	0.19	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.27		0.033	1	0.061	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.45		0.001	47.53	0.31		0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.9		0.033	1	0.62		0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	1.3		0.033	1	0.28		0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-849-PER4				PB-849-PER5				PB-849-SUB1				PB-252-LINE-4				PB-252-LINE-5			
							Sample ID	PB-849-PER4				PB-849-PER5				PB-849-SUB1				PB-252-LINE-4				PB-252-LINE-5			
							Sample Date	5/25/2007				5/25/2007				5/25/2007				5/30/2007				5/30/2007			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				6-6.5				6-6.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	**22**	D	1.7	500	**1.6**	D	0.15	500
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	**73**	D	1.7	500	63	D	1.5	500
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	11	D	1.7	500	9.9	D	1.5	500
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	94	D	1.7	500	51	D	1.5	500
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	1.6		0.42	1	2.6		0.41	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	UD	0.16	50	ND	UD	**50**	50	ND	UD	0.31	50	**49**	D	1.7	500	**43**	D	1.5	500
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	2.5		0.42	1	4.4		0.41	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-252-LINE-6				PB-252-PER-1				PB-252-PER-2				PB-252-PER-3				PB-252-PER-4			
							Sample ID	PB-252-LINE-6				PB-252-PER-1				PB-252-PER-2				PB-252-PER-3				PB-252-PER-4			
							Sample Date	5/30/2007				5/30/2007				5/30/2007				5/30/2007				5/30/2007			
							Sample Interval (ft)	6-6.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**0.71**	D	0.18	50	**10**	D	1.7	500	**2.2**	D	0.17	500	**0.72**	D	0.19	500	**1.7**	D	0.18	500
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	6.7	D	0.18	50	37	D	1.7	500	35	D	1.7	500	23	D	1.9	500	18	D	1.8	500
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	14	D	0.18	50	7.5	D	1.7	500	12	D	0.17	500	11	D	0.19	500	6.4	D	0.18	500
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.45	D	0.18	50	7.5	D	1.7	500	0.42	D	0.17	500	0.59	D	0.19	500	0.72	D	0.18	500
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	2.1		0.41	1	ND	U	0.4	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.42	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	7.9	D	0.18	50	**29**	D	1.7	500	4.8	D	0.17	500	**29**	D	1.9	500	12	D	0.18	500
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.1		0.41	1	7.9	D	0.79	2	0.48		0.38	1	0.23	J	0.42	1	3.9		0.42	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	NA				NA				NA				NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-252-PER-5				PB-252-PER-6				PB-252-SUB-1				PB-252-SUB-2				PB-252-SUB-3			
							Sample ID	PB-252-PER-5				PB-252-PER-6				PB-252-SUB-1				PB-252-SUB-2				PB-252-SUB-3			
							Sample Date	5/30/2007				5/30/2007				5/30/2007				5/30/2007				5/30/2007			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				5-5.5				5-5.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**2.1**	D	0.16	50	**4.7**	D	0.18	50	ND	UD	0.26	50	**4.7**	D	0.31	500	ND	UD	0.3	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	6.4	D	0.16	50	9.3	D	0.18	50	ND	UD	0.26	50	44	D	3.1	500	ND	UD	0.3	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.7	D	0.16	50	2.3	D	0.18	50	ND	UD	0.26	50	11	D	0.31	500	ND	UD	0.3	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.3	D	0.16	50	2.7	D	0.18	50	ND	UD	0.26	50	5.2	D	0.31	500	ND	UD	0.3	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	4.2		0.39	1	0.42		0.39	1	ND	U	0.38	1	ND	U	0.41	1	ND	U	0.43	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	**26**	D	1.6	500	3.8	D	0.18	50	0.26	JD	0.26	50	24	D	0.31	500	ND	UD	0.3	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	14	D	2	5	1		0.39	1	ND	U	0.38	1	ND	U	0.41	1	ND	U	0.43	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	NA				NA				NA				NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
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PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848-LINE-10				PB-848-LINE-11				PB-848-LINE-12				PB-848-LINE-13				PB-848-LINE-4			
							Sample ID	PB-848-LINE-10				PB-848-LINE-11				PB-848-LINE-12				PB-848-LINE-13				PB-848-LINE-4			
							Sample Date	5/30/2007				5/30/2007				5/30/2007				5/30/2007				5/30/2007			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.15	50	ND	UD	0.16	50	ND	UD	0.33	50	0.13	JD	0.21	50	ND	UD	0.19	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.69	D	0.15	50	0.084	JD	0.16	50	0.24	JD	0.33	50	0.16	JD	0.21	50	ND	UD	0.19	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.5	D	0.15	50	ND	UD	0.16	50	0.41	D	0.33	50	ND	UD	0.21	50	8.5	D	0.19	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.15	50	0.1	JD	0.16	50	ND	UD	0.33	50	ND	UD	0.21	50	ND	UD	0.19	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.66		0.43	1	0.38	J	0.4	1	ND	U	0.42	1	ND	U	0.39	1	0.75		0.43	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.28	D	0.15	50	0.3	D	0.16	50	1.9	D	0.33	50	ND	UD	0.21	50	ND	UD	0.19	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.5		0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	1.7		0.43	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848-LINE-5				PB-848-LINE-8				PB-848-LINE-9				PB-848-PER-4				PB-848-PER-5			
							Sample ID	PB-848-LINE-5				PB-848-LINE-8				PB-848-LINE-9				PB-848-PER-4				PB-848-PER-5			
							Sample Date	5/30/2007				5/30/2007				5/30/2007				5/30/2007				5/30/2007			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.3	50	ND	UD	0.27	50	ND	UD	0.18	50	**0.93**	D	0.18	50	ND	UD	0.18	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.3	50	1.7	D	0.27	50	0.2	D	0.18	50	0.27	D	0.18	50	ND	UD	0.18	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.94	D	0.3	50	8.6	D	0.27	50	0.9	D	0.18	50	0.63	D	0.18	50	ND	UD	0.18	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.3	50	ND	UD	0.27	50	0.14	JD	0.18	50	ND	UD	0.18	50	ND	UD	0.18	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.43	1	0.83		0.41	1	0.48		0.42	1	10	D	2.3	5	ND	U	0.37	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	UD	0.3	50	0.33	D	0.27	50	0.9	D	0.18	50	ND	UD	0.18	50	ND	UD	0.18	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.43	1	1.5		0.41	1	0.79		0.42	1	13	D	2.3	5	ND	U	0.37	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
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AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845-PER-6				S-364				S-364				S-365				S-365			
							Sample ID	PB-845-PER-6_02/12/2008				AOI4_S-364_4-5_30413				S-364 @ 19'_031913				S-365_4-6'				S-365 @ 12'-14'_031813			
							Sample Date	2/12/2008				3/4/2013				3/19/2013				3/4/2013				3/18/2013			
							Sample Interval (ft)	3-3.5				4-5				18.5-19				4-6				12-14			
							Sample Purpose	Tank Closure				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				4.3		0.043	1	ND	U	0.5	1	0.0025	J	0.00012	1	ND	U	0.00022	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				ND	U	**0.026**	1	ND	U	**0.1**	1	ND	U	0.000072	1	ND	U	0.00013	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				ND	U	0.028	1	ND	U	0.1	1	ND	U	0.000077	1	ND	U	0.00014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				1.88		0.033	1	ND	U	0.5	1	0.0027	J	0.000091	1	ND	U	0.00017	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	46.04	0.189	J	0.025	1	0.241		0.1	1	0.0269		0.000068	1	0.0004	J	0.00013	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				2.25		0.029	1	0.222		0.1	1	0.0098		0.000079	1	ND	U	0.00015	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	46.04	1.43		0.055	1	0.14		0.1	1	0.0085		0.00015	1	ND	U	0.00028	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	46.04	0.755	J	0.015	1	2.36		0.5	1	0.0063		0.000042	1	ND	U	0.000078	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				ND	U	0.049	1	ND	U	0.1	1	0.00024	J	0.00013	1	ND	U	0.00025	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	46.04	ND	U	0.022	1	ND	U	0.1	1	0.0025		0.00006	1	ND	U	0.00011	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.014	1	ND	U	0.039	1	0.356		0.014	1	ND	U	0.012	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.013	1	ND	U	0.039	1	0.841		0.013	1	ND	U	0.011	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.052	J	0.033	1	ND	U	0.012	1	ND	U	0.039	1	0.825		0.012	1	ND	U	0.01	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.064	J	0.033	1	ND	U	0.014	1	ND	U	0.039	1	0.802		0.013	1	ND	U	0.011	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.074	J	0.033	1	ND	U	0.015	1	ND	U	0.039	1	0.545		0.014	1	ND	U	0.013	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.064	J	0.033	1	ND	U	0.014	1	ND	U	0.039	1	0.983		0.013	1	ND	U	0.011	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.013	1	0.0934		0.039	1	0.386		0.013	1	ND	U	0.011	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.039	J	0.033	1	NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.074	J	0.001	46.04	ND	U	0.011	1	ND	U	0.039	1	0.314		0.011	1	ND	U	0.0092	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	0.0402	J	0.019	1	0.172		0.039	1	2.18		0.018	1	ND	U	0.015	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.046	J	0.033	1	0.0243	J	0.016	1	0.0583		0.039	1	1.97		0.015	1	ND	U	0.013	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				15.2		0.13	1	18.5		2	1	222		0.13	1	4.2		0.12	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	S-366				S-366				S-367				S-367				S-368			
							Sample ID	AOI4_S-366_4.5-5.5_30513				S-366@14-16_031513				S-367@14'_031313				S-367_031313@6'				AOI4_S-368_6-7_30513			
							Sample Date	3/5/2013				3/15/2013				3/13/2013				3/13/2013				3/5/2013			
							Sample Interval (ft)	4.5-5.5				14-16				13.5-14				5.5-6				6-7			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00022	1	ND	U	0.00023	1	ND	U	0.00024	1	ND	U	0.02	1	ND	U	0.022	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00014	1	ND	U	0.00014	1	ND	U	0.00015	1	ND	U	**0.012**	1	ND	U	**0.013**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00015	1	ND	U	0.00016	1	ND	U	0.013	1	ND	U	0.014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00017	1	ND	U	0.00018	1	ND	U	0.00019	1	ND	U	0.015	1	ND	U	0.017	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00013	1	0.00041	J	0.00013	1	0.00054	J	0.00014	1	ND	U	0.011	1	ND	U	0.013	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00015	1	ND	U	0.00015	1	ND	U	0.00016	1	ND	U	0.013	1	ND	U	0.015	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00028	1	ND	U	0.00029	1	ND	U	0.00031	1	ND	U	0.025	1	ND	U	0.028	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000079	1	ND	U	0.000083	1	0.017		0.000087	1	0.431	J	0.007	1	ND	U	0.0079	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00025	1	ND	U	0.00026	1	ND	U	0.00027	1	ND	U	0.022	1	ND	U	0.025	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.00012	1	ND	U	0.00012	1	ND	U	0.01	1	ND	U	0.011	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.014	1	ND	U	0.036	1	ND	U	0.035	1	ND	U	0.038	1	ND	U	0.026	2
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.04	1	ND	U	0.039	1	ND	U	0.043	1	ND	U	0.024	2
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.024	1	ND	U	0.023	1	ND	U	0.026	1	ND	U	0.022	2
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.025	1	ND	U	0.024	1	ND	U	0.026	1	ND	U	0.024	2
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.015	1	ND	U	0.047	1	ND	U	0.045	1	ND	U	0.05	1	ND	U	0.027	2
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.014	1	ND	U	0.042	1	ND	U	0.041	1	ND	U	0.045	1	ND	U	0.025	2
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.037	1	ND	U	0.036	1	ND	U	0.039	1	ND	U	0.024	2
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.011	1	ND	U	0.04	1	ND	U	0.039	1	ND	U	0.043	1	ND	U	0.02	2
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.018	1	ND	U	0.031	1	ND	U	0.03	1	ND	U	0.033	1	ND	U	0.033	2
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.015	1	ND	U	0.032	1	ND	U	0.031	1	ND	U	0.034	1	ND	U	0.028	2
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	10.9		0.15	1	4.3		0.17	1	2.6		0.17	1	6.3		0.17	1	64		0.13	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
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MSC - Medium Specific Concentration
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Exceedance Summary:

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10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

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Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	S-368				S-369				S-369				S-369				S-369			
							Sample ID	S-368@14'_031413				S-369_6-8'				S-369_8-10'				S-369@11'_04022013				S-369@32'_04022013			
							Sample Date	3/14/2013				3/4/2013				3/4/2013				4/2/2013				4/2/2013			
							Sample Interval (ft)	13.5-14				6-8				8-10				10.5-11				31.5-32			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	0.0767		0.00022	1	ND	U	0.0001	1	ND	U	0.00014	1	ND	U	0.0002	1	0.445	J	0.021	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00014	1	ND	U	0.000063	1	ND	U	0.000083	1	ND	U	0.00012	1	ND	U	**0.013**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.000067	1	ND	U	0.000088	1	ND	U	0.00013	1	ND	U	0.014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	0.0316		0.00017	1	ND	U	0.000079	1	ND	U	0.0001	1	ND	U	0.00015	1	0.8		0.016	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00013	1	ND	U	0.000059	1	ND	U	0.000078	1	ND	U	0.00011	1	**4.4**		0.012	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	0.0075		0.00015	1	ND	U	0.000069	1	ND	U	0.000091	1	ND	U	0.00013	1	0.617		0.014	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.0059		0.00028	1	ND	U	0.00013	1	ND	U	0.00017	1	ND	U	0.00025	1	1.25		0.027	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.0026	J	0.00008	1	ND	U	0.000037	1	ND	U	0.000048	1	ND	U	0.000071	1	3.29		0.0075	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00025	1	ND	U	0.00012	1	ND	U	0.00015	1	ND	U	0.00022	1	ND	U	0.024	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.000052	1	ND	U	0.000069	1	ND	U	0.0001	1	0.165		0.011	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.039	1	ND	U	0.013	1	ND	U	0.013	1	ND	U	0.014	1	0.0934		0.012	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.044	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.013	1	0.0356		0.011	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.027	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.012	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.027	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.052	1	ND	U	0.014	1	ND	U	0.014	1	ND	U	0.015	1	ND	U	0.013	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.046	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.014	1	0.0477		0.012	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.04	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.013	1	0.402		0.011	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.044	1	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.011	1	2.04		0.0096	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.035	1	ND	U	0.017	1	ND	U	0.017	1	ND	U	0.018	1	0.72		0.016	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.035	1	ND	U	0.014	1	ND	U	0.014	1	ND	U	0.015	1	0.0898		0.013	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	5.5		0.17	1	9.5		0.14	1	22.2		0.13	1	10.7		0.14	1	4.4		0.13	1

Notes:

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[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
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10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	S-370				S-370				S-371				S-371				S-371			
							Sample ID	S-370-8-10				S-370 @ 14'_04222013				AOI4_S-371_2-3_30413				AOI4_S-371_7.5-8.5_30413				S-371_18-20_40113			
							Sample Date	3/1/2013				4/22/2013				3/4/2013				3/4/2013				4/1/2013			
							Sample Interval (ft)	8-10				13.5-14				2-3				7.5-8.5				18-20			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	0.0314	J	0.012	1	0.0887	J	0.022	1	ND	U	0.00019	1	ND	U	0.00023	1	ND	U	0.024	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	**0.0073**	1	ND	U	0.0011	1	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	**0.014**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.0078	1	ND	U	0.014	1	ND	U	0.00012	1	ND	U	0.00015	1	ND	U	0.015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.0093	1	ND	U	0.017	1	ND	U	0.00015	1	ND	U	0.00018	1	ND	U	0.018	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0069	1	ND	U	0.013	1	ND	U	0.00011	1	ND	U	0.00013	1	ND	U	0.013	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.008	1	ND	U	0.015	1	ND	U	0.00013	1	ND	U	0.00015	1	ND	U	0.016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.015	1	ND	U	0.028	1	ND	U	0.00024	1	ND	U	0.00029	1	ND	U	0.03	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.95		0.0043	1	0.558		0.0078	1	ND	U	0.000068	1	ND	U	0.000082	1	0.393	J	0.0084	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.014	1	ND	U	0.025	1	ND	U	0.00021	1	ND	U	0.00026	1	ND	U	0.027	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.0061	1	ND	U	0.011	1	ND	U	0.000096	1	ND	U	0.00012	1	ND	U	0.012	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.013	1	0.145		0.04	1	ND	U	0.013	1	ND	U	0.014	1	0.0676		0.014	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.045	1	ND	U	0.013	1	ND	U	0.013	1	ND	U	0.013	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.011	1	ND	U	0.027	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.028	1	ND	U	0.013	1	ND	U	0.013	1	ND	U	0.013	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.013	1	ND	U	0.052	1	ND	U	0.014	1	ND	U	0.015	1	ND	U	0.014	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.012	1	ND	U	0.047	1	ND	U	0.013	1	ND	U	0.013	1	ND	U	0.013	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.23		0.012	1	0.548		0.041	1	ND	U	0.013	1	ND	U	0.013	1	0.831		0.013	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.0099	1	0.295		0.045	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	2.21		0.016	1	1.2		0.035	1	ND	U	0.018	1	ND	U	0.018	1	0.901		0.018	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.201		0.014	1	0.107	J	0.035	1	ND	U	0.015	1	ND	U	0.015	1	0.0273	J	0.015	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	9.9		0.13	1	14.7		0.15	1	103		0.13	1	8.4		0.15	1	2.6		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	S-372				S-372				S-373				S-379				S-379			
							Sample ID	S-372_6-8'				S-372@20'_032013				AOI4-S-373_4-6'				S-379_4-5'				S-379_8-9'			
							Sample Date	2/28/2013				3/20/2013				3/19/2013				2/28/2013				2/28/2013			
							Sample Interval (ft)	6-8				19.5-20				4-6				4-5				8-9			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00019	1	ND	U	0.022	1	2.56		0.54	1	ND	U	0.00019	1	ND	U	0.000093	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00012	1	ND	U	**0.013**	1	ND	U	**0.11**	1	ND	U	0.00011	1	ND	U	0.000057	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.014	1	ND	U	0.11	1	ND	U	0.00012	1	ND	U	0.00006	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00015	1	ND	U	0.017	1	2.88		0.54	1	ND	U	0.00014	1	ND	U	0.000071	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00011	1	ND	U	0.013	1	**1.25**		0.11	1	0.00024	J	0.00011	1	ND	U	0.000053	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00013	1	ND	U	0.015	1	3.76		0.11	1	ND	U	0.00012	1	ND	U	0.000062	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00024	1	ND	U	0.028	1	2.12		0.11	1	ND	U	0.00023	1	ND	U	0.00012	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000068	1	ND	U	0.0079	1	0.718		0.54	1	ND	U	0.000066	1	ND	U	0.000033	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00022	1	ND	U	0.025	1	ND	U	0.11	1	ND	U	0.00021	1	ND	U	0.0001	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000096	1	ND	U	0.011	1	0.339		0.11	1	ND	U	0.000093	1	ND	U	0.000047	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.039	1	0.0977		0.012	1	ND	U	0.014	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.039	1	0.223		0.012	1	ND	U	0.013	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.01	1	ND	U	0.039	1	0.194		0.011	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.011	1	ND	U	0.039	1	0.225		0.012	1	ND	U	0.014	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.014	1	ND	U	0.013	1	ND	U	0.039	1	0.12		0.013	1	ND	U	0.015	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.039	1	0.229		0.012	1	ND	U	0.014	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.011	1	0.221		0.039	1	0.043		0.012	1	ND	U	0.013	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.01	1	ND	U	0.0093	1	0.362		0.039	1	0.0194	J	0.0097	1	ND	U	0.011	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.017	1	ND	U	0.016	1	0.59		0.039	1	0.296		0.016	1	ND	U	0.018	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.015	1	ND	U	0.013	1	ND	U	0.039	1	0.351		0.014	1	ND	U	0.016	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	8.7		0.15	1	5.7		0.11	1	8.5		1.9	1	206		0.13	1	10		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	S-380				S-381				S-381				S-381				AOI4_BH-13-81			
							Sample ID	S-380_8-10				AOI4-S-381_2-3_31513				S-381 @ 12'_04242013				S-381 @ 24'_04252013				AOI-4_BH-13-81_8-10'			
							Sample Date	3/1/2013				3/15/2013				4/24/2013				4/24/2013				3/20/2013			
							Sample Interval (ft)	8-10				2-3				11.5-12				23.5-24				8-10			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00012	1	29.9		0.12	1	0.0032	J	0.00019	1	0.518	J	0.11	1	ND	U	0.00019	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.000076	1	ND	U	**0.075**	1	ND	U	0.0011	1	ND	U	0.0011	1	ND	U	0.00012	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.000081	1	ND	U	0.08	1	ND	U	0.00012	1	ND	U	0.068	1	ND	U	0.00012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.000096	1	**11.9**		0.094	1	ND	U	0.00014	1	0.543	J	0.081	1	ND	U	0.00015	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.000071	1	0.242	J	0.07	1	0.0403		0.00011	1	**1.11**		0.06	1	ND	U	0.00011	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.000083	1	17.7		0.082	1	0.0056		0.00012	1	1.01		0.07	1	ND	U	0.00013	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00016	1	5.54		0.16	1	0.0021		0.00023	1	0.439	J	0.13	1	ND	U	0.00024	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000044	1	1.97	J	0.044	1	0.0033	J	0.000066	1	11.7		0.037	1	ND	U	0.000068	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00014	1	ND	U	0.14	1	ND	U	0.00021	1	ND	U	0.12	1	ND	U	0.00021	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000063	1	0.419	J	0.062	1	0.0076		0.000093	1	0.2	J	0.053	1	ND	U	0.000096	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.014	1	ND	U	0.041	1	ND	U	0.039	1	1.79		0.04	1	ND	U	0.013	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.046	1	ND	U	0.044	1	ND	U	0.044	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.028	1	ND	U	0.026	1	ND	U	0.027	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.014	1	ND	U	0.028	1	ND	U	0.027	1	ND	U	0.027	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.015	1	ND	U	0.053	1	ND	U	0.051	1	ND	U	0.052	1	ND	U	0.013	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.014	1	ND	U	0.048	1	ND	U	0.046	1	0.0624	J	0.047	1	ND	U	0.012	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.042	1	ND	U	0.04	1	5.02		0.041	1	ND	U	0.012	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.011	1	1.18		0.046	1	ND	U	0.044	1	5.48		0.045	1	ND	U	0.0099	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.019	1	ND	U	0.036	1	ND	U	0.034	1	13		0.17	5	ND	U	0.016	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.016	1	ND	U	0.036	1	ND	U	0.035	1	1.11		0.035	1	ND	U	0.014	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	8.1		0.14	1	**2650**		0.94	5	8.5		0.15	1	5.6		0.15	1	2.5		0.13	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-82				AOI4-BH-13-84				AOI4-BH-13-85				AOI4-BH-13-86				AOI4-BH-13-86			
							Sample ID	AOI4-BH-13-82_6.5-7_031813				AOI4-BH-13-84_5.5-6_031513				AOI4-BH-13-85_5.5-6_031513				AOI4-BH-13-86_2-2.5_031513				AOI4-BH-13-86_5.5-6_031513			
							Sample Date	3/18/2013				3/15/2013				3/15/2013				3/15/2013				3/15/2013			
							Sample Interval (ft)	6.5-7				5.5-6				5.5-6				2-2.5				5.5-6			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	0.362	J	0.021	1	ND	U	0.00018	1	ND	U	0.00018	1	0.0437		0.00018	1	ND	U	0.00018	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	**0.013**	1	ND	U	0.00011	1	ND	U	0.00011	1	ND	U	0.00011	1	ND	U	0.00011	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.013	1	ND	U	0.00012	1	ND	U	0.00012	1	ND	U	0.00011	1	ND	U	0.00012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	0.147	J	0.016	1	ND	U	0.00014	1	ND	U	0.00014	1	0.0169		0.00014	1	ND	U	0.00014	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.012	1	ND	U	0.0001	1	ND	U	0.0001	1	ND	U	0.0001	1	ND	U	0.0001	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	0.339		0.014	1	ND	U	0.00012	1	ND	U	0.00012	1	0.0109		0.00012	1	ND	U	0.00012	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.186		0.026	1	ND	U	0.00023	1	ND	U	0.00023	1	0.0206		0.00022	1	ND	U	0.00023	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.129	J	0.0074	1	ND	U	0.000065	1	ND	U	0.000065	1	0.0143		0.000063	1	ND	U	0.000065	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.023	1	ND	U	0.00021	1	ND	U	0.00021	1	ND	U	0.0002	1	ND	U	0.00021	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.01	1	ND	U	0.000092	1	ND	U	0.000092	1	ND	U	0.000089	1	ND	U	0.000092	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.014	1	ND	U	0.041	1	ND	U	0.042	1	ND	U	0.041	1	ND	U	0.039	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.046	1	ND	U	0.047	1	ND	U	0.046	1	0.0692	J	0.044	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.028	1	ND	U	0.028	1	ND	U	0.028	1	0.0431	J	0.026	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.028	1	ND	U	0.029	1	ND	U	0.028	1	0.122		0.027	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.015	1	ND	U	0.054	1	ND	U	0.055	1	ND	U	0.054	1	ND	U	0.051	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.014	1	ND	U	0.048	1	ND	U	0.049	1	ND	U	0.048	1	0.0634	J	0.046	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.042	1	ND	U	0.043	1	ND	U	0.042	1	ND	U	0.04	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.011	1	ND	U	0.046	1	ND	U	0.047	1	ND	U	0.046	1	ND	U	0.044	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.018	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.036	1	0.107	J	0.034	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.016	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.036	1	0.147		0.034	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	13.3		0.14	1	6.6		0.17	1	6.9		0.19	1	7.8		0.18	1	**2140**		0.9	5

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-88				AOI4-BH-13-88				AOI4-BH-13-89				AOI4_BH-13-90				AOI4-BH-13-91			
							Sample ID	AOI4-BH-13-88_3.5-4_031413				AOI4-BH-13-88_5.5-6_031413				AOI4-BH-13-89_5.5-6_031913				AOI-4_BH-13-90_8-10'_031513				AOI4-BH-13-91_8-10'_031413			
							Sample Date	3/14/2013				3/14/2013				3/19/2013				3/15/2013				3/14/2013			
							Sample Interval (ft)	3.5-4				5.5-6				5.5-6				8-10				8-10			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	6.95		0.021	1	ND	U	0.00021	1	ND	U	0.0045	1	ND	U	0.00024	1	ND	U	0.00018	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	**0.013**	1	ND	U	0.00013	1	ND	U	0.00089	1	ND	U	0.00015	1	ND	U	0.00011	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.014	1	ND	U	0.00014	1	ND	U	0.00089	1	ND	U	0.00016	1	ND	U	0.00012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.016	1	ND	U	0.00016	1	ND	U	0.0045	1	ND	U	0.00019	1	ND	U	0.00014	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.012	1	ND	U	0.00012	1	ND	U	0.00089	1	ND	U	0.00014	1	ND	U	0.0001	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.014	1	ND	U	0.00014	1	ND	U	0.00089	1	ND	U	0.00016	1	ND	U	0.00012	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.026	1	ND	U	0.00027	1	ND	U	0.00089	1	ND	U	0.0003	1	ND	U	0.00022	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.993		0.0075	1	ND	U	0.000076	1	ND	U	0.0045	1	ND	U	0.000086	1	ND	U	0.000063	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.024	1	ND	U	0.00024	1	ND	U	0.00089	1	ND	U	0.00027	1	ND	U	0.0002	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.011	1	ND	U	0.00011	1	ND	U	0.00089	1	ND	U	0.00012	1	ND	U	0.000089	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.04	1	ND	U	0.04	1	ND	U	0.037	1	ND	U	0.042	1	ND	U	0.038	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.045	1	ND	U	0.045	1	ND	U	0.037	1	ND	U	0.047	1	ND	U	0.043	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.027	1	ND	U	0.027	1	ND	U	0.037	1	ND	U	0.028	1	ND	U	0.026	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.028	1	ND	U	0.028	1	ND	U	0.037	1	ND	U	0.029	1	ND	U	0.027	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.053	1	ND	U	0.052	1	ND	U	0.037	1	ND	U	0.055	1	ND	U	0.05	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.047	1	ND	U	0.047	1	ND	U	0.037	1	ND	U	0.049	1	ND	U	0.045	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.041	1	ND	U	0.041	1	ND	U	0.037	1	ND	U	0.043	1	ND	U	0.039	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.894		0.045	1	ND	U	0.045	1	ND	U	0.037	1	ND	U	0.047	1	ND	U	0.043	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.393		0.035	1	ND	U	0.035	1	ND	U	0.037	1	ND	U	0.037	1	ND	U	0.034	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.036	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.037	1	ND	U	0.034	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	7.1		0.19	1	6.2		0.19	1	6.7		2	1	8.6		0.19	1	7.3		0.17	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-92				AOI4-BH-13-93				AOI4_BH-13-94				AOI4-BH-13-95				AOI4-BH-13-96			
							Sample ID	AOI4-BH-13-92_8-10'				AOI4-BH-13-93_8-10'				AOI-4_BH-13-94_8-10_031513				AOI4-BH-13-95_8-10'				AOI4-BH-13-96_8-9_31413			
							Sample Date	3/18/2013				3/18/2013				3/15/2013				3/18/2013				3/14/2013			
							Sample Interval (ft)	8-10				8-10				8-10				8-10				8-9			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00019	1	ND	U	0.00016	1	ND	U	0.00023	1	ND	U	0.00019	1	0.145	J	0.017	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00011	1	ND	U	0.000098	1	ND	U	0.00014	1	ND	U	0.00011	1	ND	U	**0.011**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.0001	1	ND	U	0.00015	1	ND	U	0.00012	1	ND	U	0.011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00018	1	ND	U	0.00014	1	0.189	J	0.013	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00011	1	ND	U	0.000092	1	ND	U	0.00013	1	ND	U	0.00011	1	ND	U	0.0099	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00012	1	ND	U	0.00011	1	ND	U	0.00015	1	ND	U	0.00013	1	0.26		0.012	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00023	1	ND	U	0.0002	1	ND	U	0.00029	1	ND	U	0.00024	1	0.0535	J	0.022	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000066	1	ND	U	0.000057	1	ND	U	0.000082	1	ND	U	0.000067	1	0.143	J	0.0062	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00021	1	ND	U	0.00018	1	ND	U	0.00026	1	ND	U	0.00021	1	ND	U	0.02	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000094	1	ND	U	0.000081	1	ND	U	0.00012	1	ND	U	0.000095	1	0.0472	J	0.0087	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.025	2	ND	U	0.013	1	ND	U	0.042	1	ND	U	0.012	1	ND	U	0.039	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.023	2	ND	U	0.012	1	ND	U	0.047	1	ND	U	0.011	1	ND	U	0.043	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.022	2	ND	U	0.011	1	ND	U	0.028	1	ND	U	0.01	1	ND	U	0.026	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.024	2	ND	U	0.012	1	ND	U	0.029	1	ND	U	0.011	1	ND	U	0.027	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.026	2	ND	U	0.013	1	ND	U	0.055	1	ND	U	0.012	1	ND	U	0.051	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.024	2	ND	U	0.012	1	ND	U	0.049	1	ND	U	0.011	1	ND	U	0.046	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.023	2	ND	U	0.012	1	ND	U	0.043	1	ND	U	0.011	1	0.181		0.04	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.019	2	ND	U	0.0099	1	ND	U	0.047	1	ND	U	0.0091	1	ND	U	0.044	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.032	2	ND	U	0.016	1	ND	U	0.037	1	ND	U	0.015	1	0.282		0.034	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.027	2	ND	U	0.014	1	ND	U	0.037	1	ND	U	0.013	1	0.0538	J	0.034	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	11.6		0.13	1	10.7		0.13	1	6.2		0.19	1	5.5		0.13	1	26.2		0.17	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-97				AOI4-BH-13-98				AOI4-BH-13-99				AOI4-BH-13-100				AOI4-BH-13-101			
							Sample ID	AOI4-BH-13-97-8.5-9.5_31413				AOI4-BH-13-98_6-7_31413				AOI4-BH-13-99_2.5-3_031813				AOI4-BH-13-100_5-6_31813				AOI4-BH-13-101_7-8_31813			
							Sample Date	3/14/2013				3/14/2013				3/18/2013				3/18/2013				3/18/2013			
							Sample Interval (ft)	8.5-9.5				6-7				2.5-3				5-6				7-8			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00021	1	1.15		0.021	1	0.169	J	0.03	1	ND	U	0.00024	1	ND	U	0.00026	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00012	1	ND	U	**0.018**	1	ND	U	0.00014	1	ND	U	0.00016	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00013	1	ND	U	0.02	1	ND	U	0.00015	1	ND	U	0.00017	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	0.0948		0.00015	1	0.0611	J	0.023	1	ND	U	0.00018	1	ND	U	0.0002	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	0.127		0.00011	1	0.245		0.017	1	ND	U	0.00014	1	ND	U	0.00015	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	2.42		0.014	1	0.671		0.02	1	ND	U	0.00016	1	ND	U	0.00018	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00026	1	0.581		0.026	1	0.11	J	0.038	1	ND	U	0.0003	1	ND	U	0.00033	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000075	1	0.015		0.000071	1	0.122	J	0.011	1	ND	U	0.000085	1	ND	U	0.000094	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00023	1	ND	U	0.034	1	ND	U	0.00027	1	ND	U	0.0003	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	0.702		0.01	1	0.182		0.015	1	ND	U	0.00012	1	ND	U	0.00013	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.036	1	ND	U	0.041	1	ND	U	0.013	1	ND	U	0.013	1	ND	U	0.014	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.04	1	ND	U	0.046	1	0.0652		0.012	1	ND	U	0.012	1	ND	U	0.013	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.024	1	ND	U	0.027	1	0.0875		0.011	1	ND	U	0.011	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.025	1	ND	U	0.028	1	0.0954		0.012	1	ND	U	0.012	1	ND	U	0.013	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.047	1	ND	U	0.053	1	0.109		0.014	1	ND	U	0.014	1	ND	U	0.015	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.042	1	ND	U	0.048	1	0.114		0.012	1	ND	U	0.012	1	ND	U	0.014	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.037	1	ND	U	0.042	1	0.191		0.012	1	ND	U	0.012	1	ND	U	0.013	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.04	1	ND	U	0.046	1	0.0933		0.01	1	ND	U	0.01	1	ND	U	0.011	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.031	1	ND	U	0.036	1	0.38		0.017	1	ND	U	0.017	1	ND	U	0.018	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.032	1	ND	U	0.036	1	0.14		0.014	1	ND	U	0.014	1	ND	U	0.015	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	2.9		0.17	1	8		0.19	1	**1870**		0.14	1	12.8		0.14	1	10.2		0.12	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-102				AOI4-BH-13-103				AOI4-BH-13-104			
							Sample ID	AOI4-BH-13-102_6-7_31813				AOI4-BH-13-103_2-3_31813				AOI4-BH-13-104_6-7_31513			
							Sample Date	3/18/2013				3/18/2013				3/15/2013			
							Sample Interval (ft)	6-7				2-3				6-7			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																			
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00021	1	ND	U	0.00023	1	**75.4**		0.23	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00014	1	ND	U	**0.035**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00015	1	ND	U	0.037	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	ND	U	0.00018	1	**27.3**		0.044	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.00013	1	**1.96**		0.032	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	ND	U	0.00015	1	65.6		0.038	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00026	1	ND	U	0.00029	1	29.5		0.072	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000074	1	ND	U	0.000082	1	7.31		0.02	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00026	1	ND	U	0.064	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.00012	1	6.55		0.029	1
Semi Volatile Organic Compounds																			
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.013	1	ND	U	0.014	1	2.56		0.042	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.047	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.011	1	ND	U	0.012	1	ND	U	0.028	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.029	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.014	1	ND	U	0.015	1	ND	U	0.055	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.013	1	ND	U	0.014	1	ND	U	0.049	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.012	1	ND	U	0.013	1	6.14		0.043	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.01	1	ND	U	0.011	1	21.2		0.23	5
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.017	1	0.0341	J	0.018	1	21.7		0.18	5
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.014	1	ND	U	0.015	1	0.697		0.037	1
Metals																			
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	9.2		0.12	1	34		0.11	1	7.9		0.19	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	MW-1				MW-4				MW-4				RW-707				RW-710			
				Sample ID	MW1-050605				MW4-050605				MW-4_06_17_2013				RW-707_06_14_2013				RW-710_06_14_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/6/2005				5/6/2005				6/17/2013				6/14/2013				6/14/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0093	1	ND	U	0.0094	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				NA				1.5	J	0.19	1	**590**		0.93	5	**1370**		1.9	10
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.26	1	ND	U	1.3	5	ND	U	2.6	10
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				NA				3.7		0.36	1	**221**		1.8	5	**470**		3.6	10
Benzene	71-43-2	5	0.39	ug/l	**100**		0.5	1	ND	U	0.5	1	**128**		0.24	1	**605**		1.2	5	**1440**		2.4	10
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	27		0.8	1	ND	U	0.8	1	8.1		0.24	1	1320		1.2	5	4580		2.4	10
Ethylbenzene	100-41-4	700	1.3	ug/l	19		0.8	1	ND	U	0.8	1	0.91	J	0.23	1	293		1.1	5	**768**		2.3	10
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	10		1	1	ND	U	1	1	3.5		0.45	1	30.6		2.2	5	23.6		4.5	10
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	0.5	1	11.2		0.16	1	**26.6**		0.82	5	ND	U	1.6	10
Toluene	108-88-3	1000	860	ug/l	10		0.7	1	ND	U	0.7	1	10.1		0.23	1	336		1.1	5	908		2.3	10
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				NA				ND	U	0.021	1	0.251		0.02	1	ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				NA				2.44		0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				NA				**2.45**		0.013	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				NA				**2.48**		0.011	1	ND	U	0.01	1	ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				NA				**1.83**		0.016	1	ND	U	0.016	1	ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	1	1	**2.94**		0.012	1	ND	U	0.012	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.018	1	1.07		0.017	1	0.337		0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	32		1	1	ND	U	1	1	27.7		0.037	1	80.3		0.036	1	**196**		0.14	4
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	ND	U	1	1	4.54		0.022	1	1.74		0.021	1	0.476		0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	1	1	3.72		0.016	1	ND	U	0.015	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	ND	U	0.21	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-102				S-102				S-119				S-119			
				Sample ID	S102-050605				S-102_06_12_2013				S119-050305				S-119_06_12_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/6/2005				6/12/2013				5/3/2005				6/12/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																				
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0094	1	ND	U	0.011	1	ND	U	0.0095	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				ND	U	0.19	1	NA				ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	0.26	1	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				ND	U	0.36	1	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	ND	U	0.24	1	5		0.5	1	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	ND	U	0.8	1	ND	U	0.24	1	ND	U	0.8	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	ND	U	0.23	1	ND	U	0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	1	1	0.84	J	0.45	1	ND	U	1	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	0.16	1	ND	U	0.5	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	ND	U	0.23	1	ND	U	0.7	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																				
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				0.292		0.02	1	NA				ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				0.212		0.012	1	NA				ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.01	1	NA				ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.016	1	NA				ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	0.346		0.012	1	ND	U	1	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	0.832		0.017	1	ND	U	1	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	1	1	ND	U	0.036	1	ND	U	1	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	0.634		0.021	1	ND	U	1	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	0.341		0.015	1	ND	U	1	1	ND	U	0.015	1
Metals																				
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

EPA - Environmental Protection Agency

ug/l - microgram per liter

MSC - Medium Specific Concentration

RSL - Regional Screening Level

NS - No Standard

DL - Lab detection limit (method detection limit)

NA - Not Analyzed

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-120				S-120				S-120				S-121				S-121			
				Sample ID	S120-050305				S-120_040213				S-120_06_12_2013				S121-050405				S-121_06_13_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/3/2005				4/2/2013				6/12/2013				5/4/2005				6/13/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0098	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0094	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				ND	U	0.19	1	ND	U	0.19	1	NA				ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				ND	U	0.36	1	ND	U	0.36	1	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	ND	U	0.24	1	ND	U	0.24	1	ND	U	0.5	1	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	ND	U	0.8	1	ND	U	0.24	1	ND	U	0.24	1	ND	U	0.8	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	ND	U	0.23	1	ND	U	0.23	1	ND	U	0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	1	1	ND	U	0.45	1	ND	U	0.45	1	ND	U	1	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.5	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	ND	U	0.23	1	ND	U	0.23	1	ND	U	0.7	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				ND	U	0.02	1	ND	U	0.02	1	NA				ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.01	1	ND	U	0.01	1	NA				ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.016	1	ND	U	0.016	1	NA				ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	ND	U	0.017	1	ND	U	0.017	1	ND	U	1	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	1	1	1.39		0.036	1	ND	U	0.036	1	ND	U	1	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	ND	U	0.021	1	ND	U	0.021	1	ND	U	1	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	1	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	0.49	B	0.026	2	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
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Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-122				S-122				S-122				S-123				S-216			
				Sample ID	S122-050305				S-122_040213				S-122_06_13_2013				S123-050405				S216-042805			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/3/2005				4/2/2013				6/13/2013				5/4/2005				4/28/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0096	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0094	1	ND	U	0.0096	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				ND	U	0.19	1	ND	U	0.19	1	NA				NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1	ND	U	2	2
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				ND	U	0.36	1	ND	U	0.36	1	NA				NA			
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	ND	U	0.24	1	ND	U	0.24	1	**8**		0.5	1	**290**		1	2
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	ND	U	0.8	1	ND	U	0.24	1	ND	U	0.24	1	250		0.8	1	240		2	2
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	ND	U	0.23	1	ND	U	0.23	1	68		0.8	1	110		2	2
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	1	1	ND	U	0.45	1	ND	U	0.45	1	10		1	1	73		2	2
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.5	1	**210**		1	2
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	ND	U	0.23	1	ND	U	0.23	1	190		0.7	1	48		1	2
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				ND	U	0.02	1	ND	U	0.02	1	NA				NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	NA				NA			
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	NA				NA			
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.01	1	ND	U	0.01	1	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.016	1	ND	U	0.016	1	NA							
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1	ND	U	1	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	ND	U	0.017	1	ND	U	0.017	1	13		1	1	60		1	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	1	1	ND	U	0.036	1	ND	U	0.036	1	26		1	1	**150**		5	5
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	ND	U	0.021	1	ND	U	0.021	1	34		1	1	87		1	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	1	1	ND	U	1	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	0.17	B	0.026	2	ND	U	2.4	1	ND	U	0.21	1	ND	U	0.21	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-216				S-218				S-218				S-219				S-219			
				Sample ID	S-216_06_12_2013				S218-042805				S-218_06_14_2013				S219-042805				S-219_06_12_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	6/12/2013				4/28/2005				6/14/2013				4/28/2005				6/12/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	**0.052**		0.0098	1	ND	U	0.011	1	ND	U	0.0096	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	0.34	J	0.19	1	NA				**89.1**		0.93	5	NA				ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	**10**	10	ND	U	1.3	5	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	ND	U	0.36	1	NA				**117**		1.8	5	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	**23.7**		0.24	1	**2200**		5	10	**682**		1.2	5	**23**		0.5	1	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	3.7		0.24	1	2400		8	10	267		1.2	5	6		0.8	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	0.85	J	0.23	1	**1300**		8	10	41.5		1.1	5	ND	U	0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	26.2		0.45	1	ND	U	10	10	15.7		2.2	5	ND	U	1	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	0.6	J	0.16	1	ND	U	5	10	18.3		0.82	5	ND	U	0.5	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	4.6		0.23	1	360		7	10	24.2		1.1	5	ND	U	0.7	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	0.246		0.02	1	NA				ND	U	0.02	1	NA				ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	NA				ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.012	1	NA				ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	NA				ND	U	0.01	1	NA				ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	NA				ND	U	0.016	1	NA				ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	ND	U	1	1	ND	U	0.012	1	ND	U	1	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	3.47		0.017	1	ND	U	1	1	0.424		0.017	1	ND	U	1	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	0.036	1	**250**		5	5	82.7		0.036	1	ND	U	1	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	2.71		0.021	1	ND	U	1	1	0.386		0.021	1	ND	U	1	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	0.015	1	ND	U	1	1	ND	U	0.015	1	ND	U	1	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-222				S-222				S-222				S-222				S-223			
				Sample ID	S-222-080105				S-222_11_8_2005				S-222_040313				S-222_06_18_2013				S-223-080105			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	8/1/2005				11/8/2005				4/3/2013				6/18/2013				8/1/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0095	1	ND	U	0.02	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0096	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				NA				ND	U	0.19	1	0.79	J	0.19	1	NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	**10**	10
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				NA				ND	U	0.36	1	ND	U	0.36	1	NA			
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	**12**		1	1	ND	U	0.24	1	0.91	J	0.24	1	**6100**		**50**	100
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	10		0.8	1	13		1	1	ND	U	0.24	1	0.86	J	0.24	1	6900		8	10
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	6		1	1	ND	U	0.23	1	0.23	J	0.23	1	**1300**		8	10
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	1	1	NA				ND	U	0.45	1	ND	U	0.45	1	ND	U	10	10
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	1	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	5	10
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	5		1	1	ND	U	0.23	1	0.43	J	0.23	1	**9600**		70	100
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				3		1	1	NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				NA				ND	U	0.02	1	ND	U	0.02	1	NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				ND	U	0.014	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.029	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.022	1	ND	U	0.01	1	ND	U	0.01	1	NA			
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.034	1	ND	U	0.016	1	ND	U	0.016	1	NA			
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	0.014	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	ND	U	0.024	1	ND	U	0.017	1	ND	U	0.017	1	ND	U	1	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				ND	U	0.038	1	NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	1	1	12		1	1	ND	U	0.036	1	0.291		0.036	1	**430**		5	5
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	ND	U	0.03	1	ND	U	0.021	1	ND	U	0.021	1	ND	U	1	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	0.021	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	1	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.18	1	ND	U	3	1	1.3		0.026	2	ND	U	2.4	1	ND	U	0.18	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
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ug/l - microgram per liter
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-223				S-224				S-225				S-225				S-229			
				Sample ID	S-223_06_18_2013				S-224-080105				S225-042805				S-225_06_12_2013				S229-042805			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	6/18/2013				8/1/2005				4/28/2005				6/12/2013				4/28/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.0097	1	ND	U	0.0096	1	ND	U	0.011	1	0.033		0.0097	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	**766**		9.3	50	NA				NA				0.38	J	0.19	1	NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	**13**	50	ND	U	2	2	ND	U	1	1	ND	U	0.26	1	ND	U	**10**	10
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	**269**		18	50	NA				NA				ND	U	0.36	1	NA			
Benzene	71-43-2	5	0.39	ug/l	**7400**		**12**	50	**2000**		**13**	25	**24**		0.5	1	4.4		0.24	1	**1900**		5	10
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	2930		12	50	3500		20	25	11		0.8	1	2.7		0.24	1	630		8	10
Ethylbenzene	100-41-4	700	1.3	ug/l	**709**		11	50	690		20	25	ND	U	0.8	1	0.9	J	0.23	1	350		8	10
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	23.3	J	22	50	44		2	2	87		1	1	50		0.45	1	150		10	10
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	8.2	50	ND	U	1	2	ND	U	0.5	1	ND	U	0.16	1	ND	U	5	10
Toluene	108-88-3	1000	860	ug/l	**2850**		11	50	**2800**		18	25	10		0.7	1	2.9		0.23	1	ND	U	7	10
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	ND	U	0.021	1	NA				NA				0.436		0.02	1	NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	NA				NA				0.153		0.012	1	NA			
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.013	1	NA				NA				ND	U	0.012	1	NA			
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	NA				NA				ND	U	0.01	1	NA			
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	NA				NA				ND	U	0.016	1	NA			
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	ND	U	1	1	ND	U	1	1	0.208		0.012	1	ND	U	1	1
Fluorene	86-73-7	1900	220	ug/l	0.772		0.018	1	ND	U	1	1	56		1	1	2.74		0.017	1	11		1	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	**159**		0.15	4	100		1	1	ND	U	1	1	ND	U	0.036	1	**220**		5	5
Phenanthrene	85-01-8	1100	NS	ug/l	0.663		0.022	1	ND	U	1	1	71		1	1	2.02		0.021	1	15		1	1
Pyrene	129-00-0	130	87	ug/l	ND	U	0.015	1	ND	U	1	1	ND	U	1	1	0.407		0.015	1	ND	U	1	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	1.4		0.18	1	ND	U	0.21	1	ND	U	2.4	1	ND	U	0.21	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
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10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-239				S-243				S-246				S-26				S-26			
				Sample ID	S-239_06_17_2013				S-243_06_17_2013				S-246_06_17_2013				S26-050205				S-26_06_12_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	6/17/2013				6/17/2013				6/17/2013				5/2/2005				6/12/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0097	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	7		0.19	1	2.8		0.19	1	ND	U	0.19	1	NA				ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	2.3		0.36	1	0.41	J	0.36	1	ND	U	0.36	1	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.24	1	ND	U	0.24	1	ND	U	0.24	1	ND	U	0.5	1	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	9.8		0.24	1	3.4		0.24	1	0.24	J	0.24	1	ND	U	0.8	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	3.3		0.23	1	1.4		0.23	1	ND	U	0.23	1	ND	U	0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	0.45	1	ND	U	0.45	1	ND	U	0.45	1	ND	U	1	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.16	1	**32**		0.5	1	2.2		0.16	1
Toluene	108-88-3	1000	860	ug/l	0.53	J	0.23	1	0.47	J	0.23	1	ND	U	0.23	1	ND	U	0.7	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	ND	U	0.02	1	0.287		0.02	1	ND	U	0.2	1	NA				ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	0.18		0.012	1	1.22		0.012	1	ND	U	0.12	1	NA				ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	0.193		0.012	1	**1.12**		0.012	1	ND	U	0.12	1	NA				ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	0.242		0.01	1	**1.29**		0.01	1	ND	U	0.1	1	NA				ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	0.18		0.016	1	**0.85**		0.016	1	ND	U	0.16	1	NA				ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	0.241		0.012	1	1.4		0.012	1	ND	U	0.12	1	ND	U	1	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	0.017	1	0.152		0.017	1	ND	U	0.17	1	ND	U	1	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	0.036	1	ND	U	0.036	1	ND	U	0.36	1	ND	U	1	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	0.195		0.021	1	1.16		0.021	1	ND	U	0.21	1	ND	U	1	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	0.323		0.015	1	1.83		0.015	1	ND	U	0.15	1	ND	U	1	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-27				S-28				S-28				S-31				S-329			
				Sample ID	S27-050205				S28-050405				S-28_06_13_2013				S31-050205				S-329_06_17_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/2/2005				5/4/2005				6/13/2013				5/2/2005				6/17/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0095	1	ND	U	0.0095	1	ND	U	0.011	**1**	ND	U	0.0095	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				NA				2.9		0.19	1	NA				0.28	J	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.26	1	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				NA				0.4	J	0.36	1	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	**51**		0.5	1	**5.3**		0.24	1	**53**		0.5	1	**8.6**		0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	26		0.8	1	13		0.8	1	0.94	J	0.24	1	150		0.8	1	0.35	J	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	12		0.8	1	0.34	J	0.23	1	39		0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	5		1	1	6		1	1	9.6		0.45	1	6		1	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	**270**		3	5	19.5		0.16	1	**170**		0.5	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	ND	U	0.7	1	0.47	J	0.23	1	40		0.7	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				NA				ND	U	0.022	1	NA				ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				NA				ND	U	0.012	1	NA				ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				NA				ND	U	0.013	**1**	NA				ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				NA				ND	U	0.011	1	NA				ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				NA				ND	U	0.017	**1**	NA				ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.013	1	NA				ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	12		1	1	9.79		0.018	1	NA				ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	14		1	1	12		1	1	ND	U	0.038	1	NA				0.197		0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	26		1	1	16.3		0.022	1	NA				0.309		0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	1	1	3.31		0.016	1	NA				ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	ND	U	0.21	1	ND	U	2.4	1	ND	U	0.21	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
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DF - Dilution Factor
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Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-364				S-366				S-367				S-368				S-370			
				Sample ID	S-364_06_12_2013				S-366_06_12_2013				S-367_06_12_2013				S-368_06_12_2013				S-370_06_14_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	6/12/2013				6/12/2013				6/12/2013				6/12/2013				6/14/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	14.8		0.19	1	**148**		0.19	1	53.9		0.19	1	2.8		0.19	1	0.28	J	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	13.5		0.36	1	45.1		0.36	1	14.7		0.36	1	1	J	0.36	1	ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	**9.8**		0.24	1	**232**		1.2	5	0.83	J	0.24	1	1.3		0.24	1	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	16.7		0.24	1	335		0.24	1	45.3		0.24	1	6.6		0.24	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	40.8		0.23	1	130		0.23	1	57.6		0.23	1	2.2		0.23	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	57.7		0.45	1	52.9		0.45	1	45.8		0.45	1	42		0.45	1	4		0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	0.54	J	0.16	1	0.46	J	0.16	1	0.38	J	0.16	1	0.36	J	0.16	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	2.7		0.23	1	3.7		0.23	1	0.28	J	0.23	1	0.97	J	0.23	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	0.278		0.02	1	0.605		0.02	1	ND	U	0.02	1	0.138		0.02	1	ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	0.327		0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	0.429		0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	1.21		0.017	1	3.24		0.017	1	0.873		0.017	1	1.56		0.017	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	19.9		0.36	1	NA				1.34		0.036	1	ND	U	0.036	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	1.29		0.021	1	2.61		0.021	1	ND	U	0.021	1	0.887		0.021	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	0.21		0.015	1	0.711		0.015	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
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ug/l - microgram per liter
MSC - Medium Specific Concentration
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Exceedance Summary:

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10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
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Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-371				S-372				S-379				S-38				S-38			
				Sample ID	S-371_06_14_2013				S-372_06_13_2013				S-379_06_12_2013				S38-050305				S-38_11_8_2005			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	6/14/2013				6/13/2013				6/12/2013				5/3/2005				11/8/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0097	1	ND	U	0.02	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	44.5		0.19	1	0.63	J	0.19	1	0.53	J	0.19	1	NA				NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1	ND	U	1	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	18.3		0.36	1	0.41	J	0.36	1	3.9		0.36	1	NA				NA			
Benzene	71-43-2	5	0.39	ug/l	**13.6**		0.24	1	1.5		0.24	1	**19.9**		0.24	1	ND	U	0.5	1	**16**		1	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	55.6		0.24	1	0.86	J	0.24	1	1.3		0.24	1	ND	U	0.8	1	ND	U	1	1
Ethylbenzene	100-41-4	700	1.3	ug/l	15.5		0.23	1	1.4		0.23	1	1.5		0.23	1	ND	U	0.8	1	ND	U	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	15.5		0.45	1	24.4		0.45	1	3.4		0.45	1	ND	U	1	1	NA			
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	2.3		0.16	1	4.7		0.16	1	ND	U	0.16	1	ND	U	0.5	1	ND	U	1	1
Toluene	108-88-3	1000	860	ug/l	6		0.23	1	0.28	J	0.23	1	0.54	J	0.23	1	ND	U	0.7	1	ND	U	1	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				ND	U	1	1
Anthracene	120-12-7	66	1300	ug/l	ND	U	0.02	1	ND	U	0.02	1	ND	U	0.02	1	NA				NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	NA				ND	U	0.014	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	NA				ND	U	0.029	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	NA				ND	U	0.022	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	NA				ND	U	0.034	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1	ND	U	0.014	1
Fluorene	86-73-7	1900	220	ug/l	1.44		0.017	1	0.174		0.017	1	ND	U	0.017	1	ND	U	1	1	ND	U	0.029	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				ND	U	0.022	1
Naphthalene	91-20-3	100	0.14	ug/l	2.52		0.036	1	ND	U	0.036	1	ND	U	0.036	1	ND	U	1	1	ND	U	1	1
Phenanthrene	85-01-8	1100	NS	ug/l	0.606		0.021	1	ND	U	0.021	1	0.199		0.021	1	ND	U	1	1	ND	U	0.03	1
Pyrene	129-00-0	130	87	ug/l	ND	U	0.015	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	1	1	ND	U	0.021	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	0.21	1	ND	U	3	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-38				S-38				S-380				S-381				S-38I			
				Sample ID	S-38_040313				S-38_06_13_2013				S-380_06_12_2013				S-381_06_14_2013				S38I-050305			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	4/3/2013				6/13/2013				6/12/2013				6/14/2013				5/3/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0098	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	41.3		0.19	1	1.2	J	0.19	1	ND	U	0.19	1	**1130**		1.9	10	NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	2.6	10	ND	U	1	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	16.7		0.36	1	0.49	J	0.36	1	ND	U	0.36	1	**374**		3.6	10	NA			
Benzene	71-43-2	5	0.39	ug/l	1.9		0.24	1	0.29	J	0.24	1	2.1		0.24	1	**296**		2.4	10	ND	U	0.5	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	23.9		0.24	1	0.43	J	0.24	1	0.45	J	0.24	1	3600		2.4	10	ND	U	0.8	1
Ethylbenzene	100-41-4	700	1.3	ug/l	10.6		0.23	1	0.37	J	0.23	1	0.26	J	0.23	1	554		2.3	10	ND	U	0.8	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	7.5		0.45	1	ND	U	0.45	1	ND	U	0.45	1	60.6		4.5	10	ND	U	1	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.16	1	**26**		1.6	10	ND	U	0.5	1
Toluene	108-88-3	1000	860	ug/l	2.2		0.23	1	ND	U	0.23	1	0.27	J	0.23	1	**1770**		2.3	10	ND	U	0.7	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	ND	U	0.02	1	ND	U	0.02	1	ND	U	0.02	1	0.898		0.02	1	NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	NA			
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	NA			
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	0.017	1	ND	U	0.017	1	0.3		0.017	1	9.73		0.034	2	ND	U	1	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	1.66		0.036	1	ND	U	0.036	1	ND	U	0.036	1	**136**		0.071	2	ND	U	1	1
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	0.021	1	ND	U	0.021	1	ND	U	0.021	1	13.7		0.042	2	ND	U	1	1
Pyrene	129-00-0	130	87	ug/l	ND	U	0.015	1	ND	U	0.015	1	ND	U	0.015	1	0.677		0.015	1	ND	U	1	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	1.4		0.026	2	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	0.21	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-39				S-39				S-39				S-39				S-40			
				Sample ID	S39-050305				S-39_11_8_2005				S-39_040213				S-39_06_13_2013				S40-050305			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/3/2005				11/8/2005				4/2/2013				6/13/2013				5/3/2005			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0097	1	ND	U	0.02	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0099	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				NA				ND	U	0.19	1	ND	U	0.19	1	NA			
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				NA				ND	U	0.36	1	ND	U	0.36	1	NA			
Benzene	71-43-2	5	0.39	ug/l	ND	U	0.5	1	ND	U	1	1	ND	U	0.24	1	ND	U	0.24	1	**370**		3	5
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	ND	U	0.8	1	ND	U	1	1	ND	U	0.24	1	ND	U	0.24	1	10		0.8	1
Ethylbenzene	100-41-4	700	1.3	ug/l	ND	U	0.8	1	ND	U	1	1	ND	U	0.23	1	ND	U	0.23	1	21		0.8	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	1	1	NA				ND	U	0.45	1	ND	U	0.45	1	40		1	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.5	1	ND	U	1	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.5	1
Toluene	108-88-3	1000	860	ug/l	ND	U	0.7	1	ND	U	1	1	ND	U	0.23	1	ND	U	0.23	1	14		0.7	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				ND	U	1	1	NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				NA				ND	U	0.02	1	ND	U	0.02	1	NA			
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				ND	U	0.014	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.029	1	ND	U	0.012	1	ND	U	0.012	1	NA			
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.022	1	ND	U	0.01	1	ND	U	0.01	1	NA			
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.034	1	ND	U	0.016	1	ND	U	0.016	1	NA			
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	0.014	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	1	1
Fluorene	86-73-7	1900	220	ug/l	ND	U	1	1	ND	U	0.024	1	ND	U	0.017	1	ND	U	0.017	1	ND	U	1	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				ND	U	0.038	1	NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	ND	U	1	1	ND	U	1	1	ND	U	0.036	1	ND	U	0.036	1	ND	U	1	1
Phenanthrene	85-01-8	1100	NS	ug/l	ND	U	1	1	ND	U	0.03	1	ND	U	0.021	1	ND	U	0.021	1	16		1	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	ND	U	0.021	1	ND	U	0.015	1	ND	U	0.015	1	ND	U	1	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	ND	U	3	1	0.2	B	0.026	2	ND	U	2.4	1	ND	U	0.21	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
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ug/l - microgram per liter
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-40				S-40				S-40				S-96				S-96			
				Sample ID	S-40_11_8_2005				S-40_040813				S-40_06_17_2013				S96-080105				S-96_06_14_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	11/8/2005				4/8/2013				6/17/2013				8/1/2005				6/14/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.02	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.0097	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				ND	U	0.19	1	ND	U	0.19	1	NA				ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	**10**	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	1	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				ND	U	0.36	1	ND	U	0.36	1	NA				ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	**436**		1	1	ND	U	0.24	1	0.58	J	0.24	1	ND	U	0.5	1	0.46	J	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	56		10	1	ND	U	0.24	1	ND	U	0.24	1	ND	U	0.8	1	0.25	J	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	28		1	1	ND	U	0.23	1	ND	U	0.23	1	ND	U	0.8	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	NA				ND	U	0.45	1	1.3	J	0.45	1	ND	U	1	1	0.46	J	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	10	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.5	1	1.2		0.16	1
Toluene	108-88-3	1000	860	ug/l	17		1	1	ND	U	0.23	1	ND	U	0.23	1	ND	U	0.7	1	1.1		0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	**117**		10	1	NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				ND	U	0.02	1	0.307		0.02	1	NA				ND	U	0.2	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.014	1	ND	U	0.012	1	0.236		0.012	1	NA				ND	U	0.12	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.029	1	ND	U	0.012	1	ND	U	0.012	**1**	NA				ND	U	0.12	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.022	1	ND	U	0.01	1	ND	U	0.01	1	NA				ND	U	0.1	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.034	1	ND	U	0.016	1	ND	U	0.016	**1**	NA				ND	U	0.16	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.014	1	ND	U	0.012	1	0.31		0.012	1	ND	U	1	1	ND	U	0.12	1
Fluorene	86-73-7	1900	220	ug/l	0.9		0.024	1	0.135		0.017	1	0.586		0.017	1	ND	U	1	1	4.16		0.17	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	ND	U	0.038	1	NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	12		10	1	ND	U	0.036	1	ND	U	0.036	1	ND	U	1	1	ND	U	0.36	1
Phenanthrene	85-01-8	1100	NS	ug/l	1.1		0.03	1	0.255		0.021	1	1.27		0.021	1	ND	U	1	1	ND	U	0.21	1
Pyrene	129-00-0	130	87	ug/l	0.1		0.021	1	ND	U	0.015	1	0.418		0.015	1	ND	U	1	1	3.11		0.15	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	3	1	ND	U	1.7	1	ND	U	2.4	1	ND	U	0.18	1	2.9	B	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
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PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-97				S-97				S-234				S-244				S-244			
				Sample ID	S97-050405				S-97_06_13_2013				S-234_06_17_2013				S-244_06_13_2013				S-244_06_14_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater				Groundwater				Groundwater			
				Sample Date	5/4/2005				6/13/2013				6/17/2013				6/13/2013				6/14/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																								
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.0094	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	NA				9.3		0.19	1	10.8		0.19	1	**133**		0.19	1	7		0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	**10**	10	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	NA				10		0.36	1	6.1		0.36	1	40.6		0.36	1	2.3		0.36	1
Benzene	71-43-2	5	0.39	ug/l	**600**		5	10	2.8		0.24	1	0.29	J	0.24	1	**223**		1.2	5	2.1		0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	230		8	10	4.7		0.24	1	13		0.24	1	387		0.24	1	18.3		0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	63		8	10	1.9		0.23	1	3.5		0.23	1	156		0.23	1	2.8		0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	ND	U	10	10	4.8		0.45	1	ND	U	0.45	1	14.7		0.45	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	5	10	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.16	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	ND	U	7	10	0.68	J	0.23	1	0.46	J	0.23	1	62.8		0.23	1	2.3		0.23	1
Semi-Volatile Organic Compounds																								
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	NA				ND	U	0.02	1	ND	U	0.02	1	ND	U	0.02	1	ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	NA				ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	NA				ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	NA				ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	1	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Fluorene	86-73-7	1900	220	ug/l	25		1	1	1.39		0.017	1	ND	U	0.017	1	0.469		0.017	1	ND	U	0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	**110**		1	1	ND	U	0.036	1	0.889		0.036	1	8.19		0.036	1	1.06		0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	47		1	1	2.21		0.021	1	0.377		0.021	1	0.171		0.021	1	ND	U	0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	1	1	0.434		0.015	1	0.204		0.015	1	ND	U	0.015	1	ND	U	0.015	1
Metals																								
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	0.21	1	**21.4**		2.4	1	ND	U	2.4	1	ND	U	2.4	1	ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
EPA - Environmental Protection Agency
ug/l - microgram per liter
MSC - Medium Specific Concentration
RSL - Regional Screening Level
NS - No Standard
DL - Lab detection limit (method detection limit)
NA - Not Analyzed
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier

Qualifiers:

U - The analyte was analyzed but not detected above the reporting limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 6
Summary of Groundwater Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Groundwater MSC[1]	EPA Tapwater RSL[2]	Location	S-245				S-36				S-57			
				Sample ID	S-245_06_14_2013				S-36_06_14_2013				S-57_06_12_2013			
				Sample Matrix	Groundwater				Groundwater				Groundwater			
				Sample Date	6/14/2013				6/14/2013				6/12/2013			
				Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.05	0.0065	ug/l	ND	U	0.011	1	ND	U	0.011	1	ND	U	0.011	1
1,2,4-Trimethylbenzene	95-63-6	62	15	ug/l	**405**		0.93	5	3		0.19	1	ND	U	0.19	1
1,2-Dichloroethane	107-06-2	5	0.15	ug/l	ND	U	0.26	1	ND	U	0.26	1	ND	U	0.26	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	53	87	ug/l	**112**		0.36	1	**55.5**		0.36	1	ND	U	0.36	1
Benzene	71-43-2	5	0.39	ug/l	**164**		0.24	1	**288**		1.2	5	ND	U	0.24	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	10000	190	ug/l	490		1.2	5	121		0.24	1	ND	U	0.24	1
Ethylbenzene	100-41-4	700	1.3	ug/l	198		0.23	1	36.9		0.23	1	ND	U	0.23	1
Isopropylbenzene (Cumene)	98-82-8	3500	390	ug/l	11.3		0.45	1	41.8		0.45	1	ND	U	0.45	1
Tert-Butyl Methyl Ether	1634-04-4	20	12	ug/l	ND	U	0.16	1	**21.9**		0.16	1	ND	U	0.16	1
Toluene	108-88-3	1000	860	ug/l	35.9		0.23	1	71		0.23	1	ND	U	0.23	1
Semi-Volatile Organic Compounds																
2-Hexanone	591-78-6	44	34	ug/l	NA				NA				NA			
Anthracene	120-12-7	66	1300	ug/l	0.155		0.02	1	ND	U	0.02	1	ND	U	0.02	1
Benzo(A)Anthracene	56-55-3	3.6	0.029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	0.2	0.0029	ug/l	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.012	1
Benzo(B)Fluoranthene	205-99-2	1.2	0.029	ug/l	ND	U	0.01	1	ND	U	0.01	1	ND	U	0.01	1
Benzo(G,H,I)Perylene	191-24-2	0.26	NS	ug/l	ND	U	0.016	1	ND	U	0.016	1	ND	U	0.016	1
Chrysene	218-01-9	1.9	2.9	ug/l	ND	U	0.012	1	ND	U	0.012	1	0.176		0.012	1
Fluorene	86-73-7	1900	220	ug/l	0.989		0.017	1	11.5		0.017	1	4.26		0.017	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	3.6	0.029	ug/l	NA				NA				NA			
Naphthalene	91-20-3	100	0.14	ug/l	8.63		0.036	1	ND	U	0.036	1	ND	U	0.036	1
Phenanthrene	85-01-8	1100	NS	ug/l	0.264		0.021	1	16.5		0.021	1	4.16		0.021	1
Pyrene	129-00-0	130	87	ug/l	ND	U	0.015	1	0.802		0.015	1	0.768		0.015	1
Metals																
Arsenic	7440-38-2	10	0.045	ug/l	NA				NA				NA			
Cadmium	7440-43-9	5	6.9	ug/l	NA				NA				NA			
Chromium III	16065-83-1	100	16000	ug/l	NA				NA				NA			
Chromium, Hexavalent	18540-29-9	100	0.031	ug/l	NA				NA				NA			
Chromium, Total	7440-47-3	100	NS	ug/l	NA				NA				NA			
Copper	7440-50-8	1000	620	ug/l	NA				NA				NA			
Lead	7439-92-1	5	NS	ug/l	ND	U	2.4	1	NA				ND	U	2.4	1
Mercury	7439-97-6	2	0.63	ug/l	NA				NA				NA			
Nickel	7440-02-0	100	300	ug/l	NA				NA				NA			
Oil & Grease, Total Rec	OILGREASE	NS	NS	ug/l	NA				NA				NA			
Silver	7440-22-4	100	71	ug/l	NA				NA				NA			
Zinc	7440-66-6	2000	4700	ug/l	NA				NA				NA			

Notes:

[1] PADEP Non-Residential Groundwater MSC in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[2] EPA Tapwater Regional Screening Level (last updated Nov. 2012)
CAS - Chemical Abstracts Service Registry Number
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Groundwater MSC
10	Reported result exceeds the PADEP Non-Residential Groundwater MSC and the EPA Tapwater RSL
10	DL exceeds the PADEP Non-Residential Groundwater MSC

Table 7
Summary of Air Analytical Results
AOI-4
PES Facility
Philadelphia, Pennsylvania

Sample	Type	Location/description	Volatile hydrocarbon compounds											
			Methyl tert-butyl ether	1,2-dichloro-ethane	Benzene	Toluene	1,2-dibromo-ethane	Ethyl-benzene	m,p-xylenes	o-xylene	Xylenes, total	Cumene	1,3,5-trimethyl-benzene	1,2,4-trimethyl-benzene
19	I/s	15 pump house, inside	ND	ND	1.1	3.6	ND	0.66	2.6	0.85	3.45	0.16	0.27	0.68
20	O/s	15 pump house under roof w/ pump equipment, approx 8-10' below grade	ND	ND	0.65	2.0	ND	0.19	0.65	0.24	0.89	ND	ND	0.19
21	O/s	15 pump house outside, at grade	ND	ND	1.5	5.0	ND	0.7	3.0	0.94	3.94	ND	0.33	0.74

Notes

(1) All units are in micrograms per cubic meter of air (ug/m3) by volume.

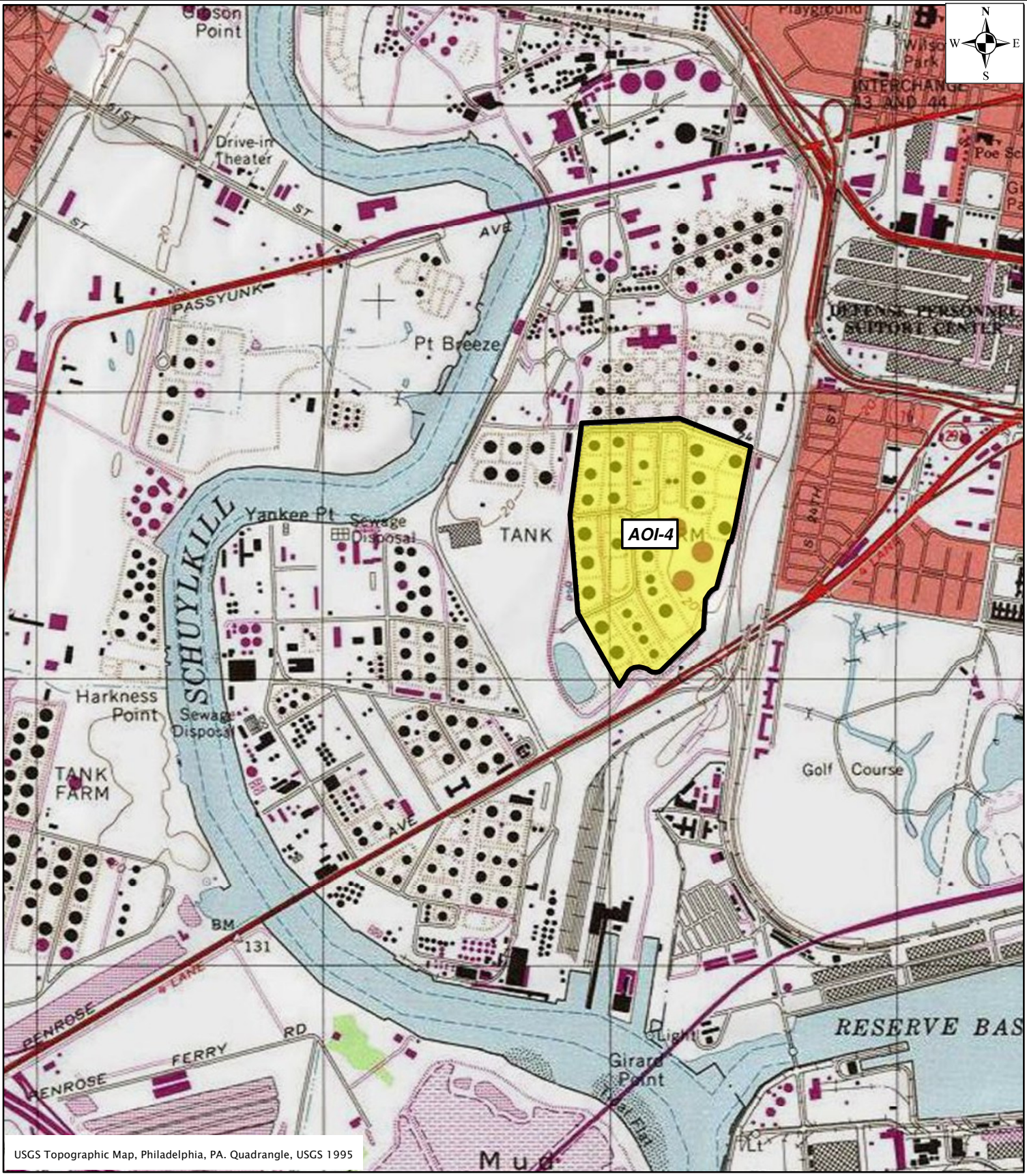
(2) All samples were analyzed utilizing EPA Method TO-15.

(3) I=Indoor air sample; "O"=Outdoor air sample; "TB"= Trip Blank, SUMMA canisters which were not opened, used for QA/QC.

(4) ND=Non-Detect

(5) Source: "Evaluation of Specific Volatile Organic Compounds in Occupied Buildings at the Former Philadelphia Refinery," Stantec, March 2013

FIGURES



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

SUNOCO

PHILADELPHIA ENERGY SOLUTIONS

Sunoco, Inc. (R&M)

PES Facility

3144 Passyunk Avenue
Philadelphia, PA. 19145

Figure 1: Site Location Map
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility

Philadelphia Pennsylvania

Job Number	Scale: 1" = 1,500'	Date
2574601	0 750 1,500 Feet	August 13, 2013

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 1- Site Location Map_8-13-13.mxd



Legend

Area of Interest (AOI) Boundary

Figure 2: Site Plan
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

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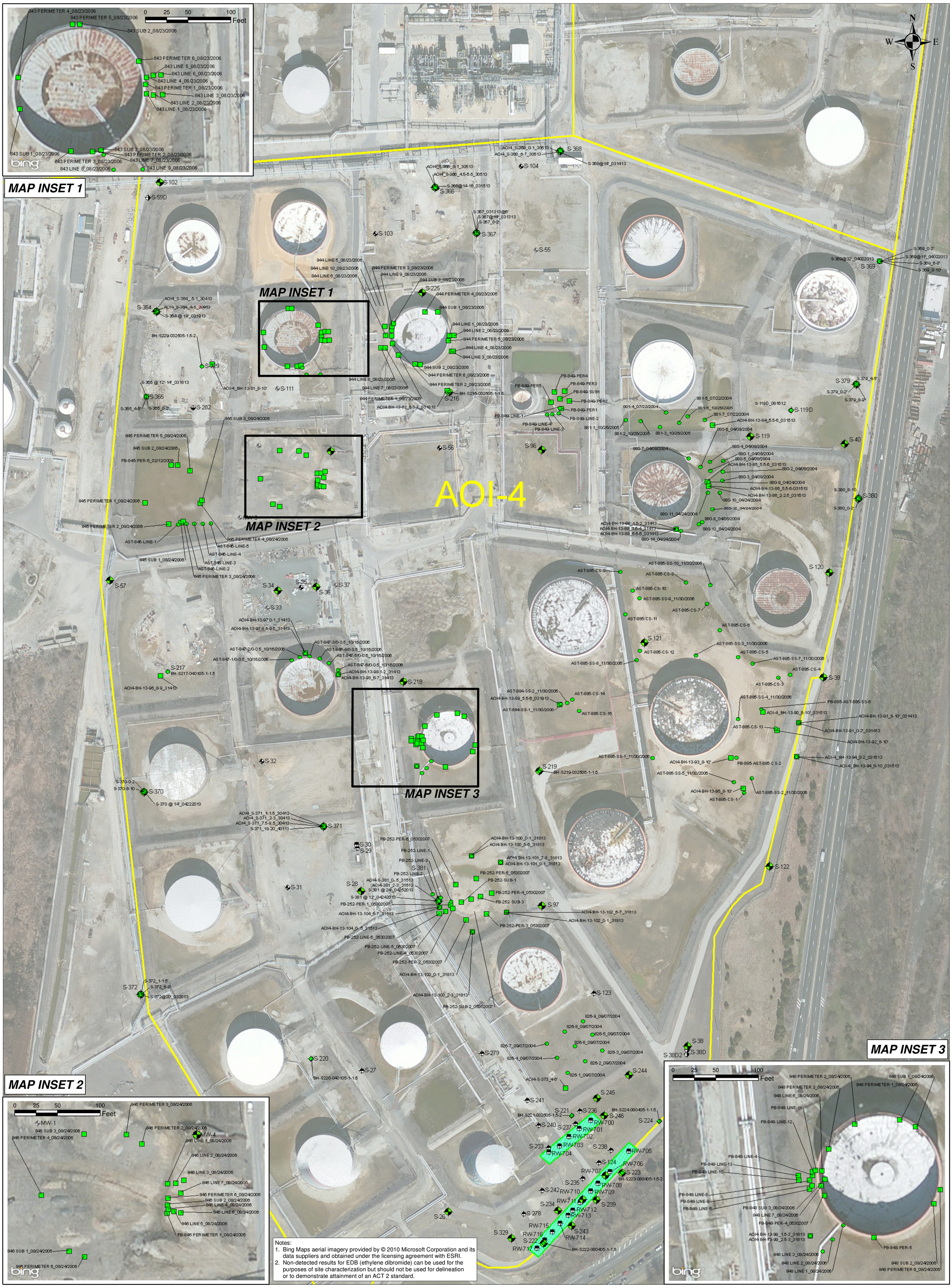
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MAP INSET 2
MAP INSET 3
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S-59D
S-103
S-104
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S-367
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S-55
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S-225
S-229
S-111
S-216
S-365
S-282
S-56
S-96
S-119
S-119D
S-40
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S-120
S-121
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S-57
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S-35
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S-33
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S-222
S-243
S-372
S-219
MW-1
MW-4
MW-5
Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.
Legend
Shallow Soil Boring Location
Deep Soil Boring Location
Shallow Monitoring Well Sampled
Shallow Monitoring Well Location
Shallow/Intermediate Monitoring Well Location
Intermediate Monitoring Well Location
Deep Monitoring Well Location
Intermediate Recovery Well Location
Damaged/Abandoned/Unable to Locate
Penrose Avenue Recovery System
AOIs
Figure 3: Completed Activities Plan
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145
0 55 110 220 Feet
SCALE: 1" = 110'
DATE: September 26, 2013
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CKD. BY: PT
JOB#: 2574601
Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 3 - Completed Activities Plan_9-26-13.mxd

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AOI-2
AOI-3
AOI-4
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S-59D
S-364
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S-365
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S-216
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RW-712
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S-26
RW-713
RW-714
S-243
S-329
RW-716
RW-715
S-222
RW-717
MW-3
bing

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

Legend

- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate
- P — P' Cross Section Location
- Area of Interest (AOI) Boundary

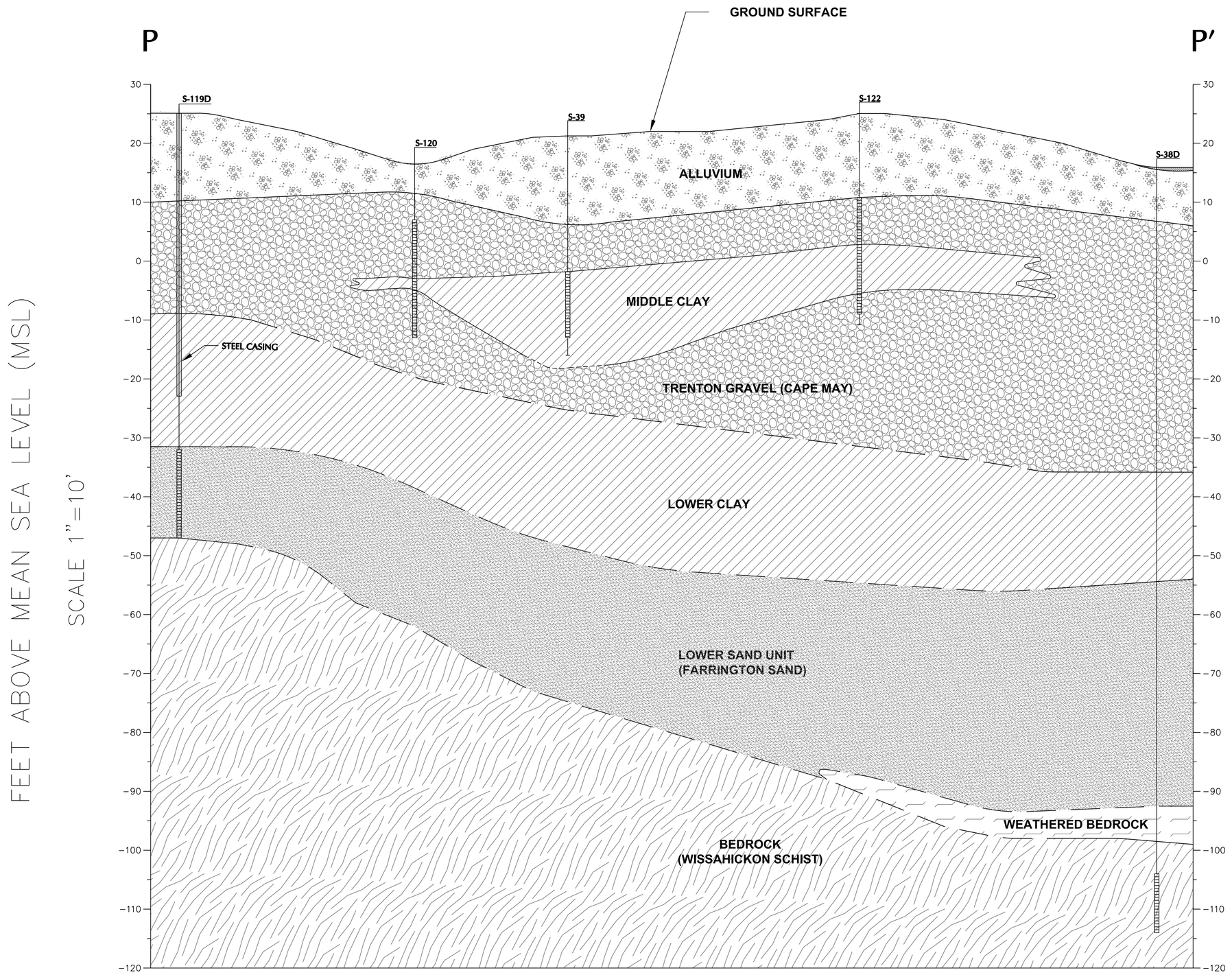
Figure 4: Cross Section Location Plan
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 4 - Cross Section Location Plan_8-14-13.mxd



LEGEND

- FILL
- ALLUVIUM
- SAND AND GRAVEL
- CLAY/SILT AND SOME SAND
- SAND
- WEATHERED BEDROCK
- BEDROCK
- S-119D WELL ID
- WELL SCREEN

10 0 2 4 10
VERTICAL SCALE IN FEET

100 0 50 100
HORIZONTAL SCALE IN FEET

SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

Project
SUNOCO, INC. (R & M)
PES FACILITY
3144 PASSYUNK AVENUE
PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title
GEOLOGIC CROSS SECTION P-P′

Project No. 2574601	Drawing No. 5
Date 14 AUGUST 13	
Scale AS SHOWN	
Drn. By AJC	
Last Revised 25 AUGUST 05	1 Of 1

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AOI-3
AOI-4
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S-59D NM
S-366 -0.20
S-368 0.41
S-104 0.75
S-103 0.17
S-367 -0.03
S-55 NM
S-369 -0.64
S-225 0.36
S-364 -0.34
S-229 NM
S-111 NM
S-216 0.26
S-379 -0.25
S-365 -0.22
S-282 -1.24
S-119D NM
S-119 0.02
S-40 NM
MW-1 NM
MW-4 -1.33
S-56 0.20
S-96 0.00
S-380 0.07
MW-3 NM
S-57 0.07
S-35 -0.24
S-34 -0.19
S-36 -0.10
S-37 NM
S-33 NM
S-120 0.30
S-121 0.32
S-217
S-218 0.39
S-39 0.31
S-32 0.27
S-219 0.21
S-370 -0.25
S-371 1.48
S-30 0.10
S-29 1.97
S-28 4.14
S-31 NM
S-381 -0.04
S-97 0.50
S-122 0.27
S-123 -3.84
S-372 0.18
S-220 -0.71
S-27 NM
S-279 0.49
S-38 0.15
S-38D NM
S-38D2 NM
RW-702 1.50
S-237 0.10
S-236 0.09
S-244 -2.77
S-245 0.27
S-246 0.76
S-241 -0.17
S-221 0.36
RW-703 -2.20
S-240 -0.03
RW-700 0.06
S-224 0.23
S-233 3.15
RW-701
S-238 0.23
S-124 0.15
RW-705 0.15
RW-704 -7.29
RW-706 0.04
S-223 0.27
S-235 0.24
RW-712 -2.04
RW-709 -0.45
RW-707 0.13
RW-708 0.14
S-242 0.15
S-234 -0.13
S-239 0.17
S-278 0.21
S-26 0.20
RW-710 -0.14
RW-711 -2.70
RW-716 0.16
RW-713 -1.29
S-329 -2.03
RW-714 -2.89
RW-717 0.22
RW-715 -2.29
S-222 0.72
S-243 0.36
bing

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

Legend

- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate
- Groundwater Elevation Contour (ft.)
- Inferred Groundwater Elevation Contour (ft.)
- Area of Interest (AOI) Boundary

Figure 6: Fill/Alluvium and Trenton Gravel Wells Groundwater Elevations - June 2013
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: September 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 6 - AOI4 FillAlluvium and Trenton Gravel Wells Groundwater Elevations June 2013 noRWs_9-26-13.mxd



Legend

- Indoor Air Sample Locations
- Occupied Buildings Not Under Positive Pressure
- Area of Interest (AOI) Boundary

Figure 7: Indoor Air Sample Locations- October 2012
AOI 4 Site Characterization/ Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: Semptember 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 257460 1

Path: \\langan.com\data\DT\data6\257460 1\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 7 - Indoor Air Sample Locations_9-26-13.mxd



Legend

- Area of Interest (AOI) Boundary
- 271 — Tank Closed in Place
- 270 — Tank With Release Assessment
- 846 — Closed in Place Following Release

Figure 8: Storage Tanks in AOI 4
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

PHILADELPHIA ENERGY SOLUTIONS

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: September 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 8 - Storage Tanks in AOI 4_9-26-13.mxd

AOI-4

MAP INSET 1

MAP INSET 2

MAP INSET 3

Notes:
1. MSCs for Benzene, Toluene, and Naphthalene were exceeded in sample PB-880-SURFACE_04/08/2004 (as seen in Table 4-Summary of Surface and Soil Analytical Results) . The exact coordinates of this sample are unknown.
2. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
3. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Legend

- Shallow Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs (See Note 3)
- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs (See Note 3)
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs

- 271 — Tank Closed in Place
- 270 — Tank With Release Assessment
- 846 — Closed in Place Following Release
- AOIs

S-373
AOI4-S-373_4-6'
VOCs in mg/kg
Benzene - 1.25

Sample ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Figure 9: Summarry of Soil Sample Exceedances
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

SCALE: 1" = 110'
DATE: September 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 9 - AOI4 Soil Results Exceedances_9-26-13.mxd



Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. LNAPL occurence based on June 2013 gauging event.
3. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Legend

- Shallow Monitoring Well with No Exceedance of PADEP Non-Res GW MSCs
- Shallow Monitoring Well Location with No Exceedance of PADEP Non-Res GW MSCs (see Note 2)
- Shallow Monitoring Well Location with Exceedance of PADEP Non-Res GW MSCs
- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate

- 271 — Tank Closed in Place
- 270 — Tank With Release Assessment
- 846 — Closed in Place Following Release
- Groundwater Elevation Contour (ft.)
- Inferred Groundwater Elevation Contour (ft.)

LNAPL Types
- Middle Distillate
- Gasoline/Middle Distillate
- Middle Distillate/Light End Feed Stock
- AOIs

S-329
S-329_06_17_2013
VOCs in ug/L
Benzene - 8.6

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Figure 10: Summary of Groundwater Sample Exceedances - June 2013
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: September 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 10 - AOI4 GW Results Exceedances 9-26-13.mxd

AOI-4

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Wells gauged by Aquaterra June 2013.

Legend

- Shallow Monitoring Well with Apparent LNAPL Thickness (ft.)
- Shallow/Intermediate Monitoring Well with Apparent LNAPL Thickness (ft.)
- Intermediate Monitoring Well with Apparent LNAPL Thickness (ft.)
- Intermediate Recovery Well with Apparent LNAPL Thickness (ft.)
- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate
- 271 Tank Closed in Place
- 278 Tank With Release Assessment
- 846 Closed in Place Following Release
- Area of Interest (AOI) Boundary

LNAPL Types

- Middle Distillate
- Gasoline/Middle Distillate
- Middle Distillate/Light End Feed Stock

Figure 11: Apparent LNAPL Thickness
June 2013
AOI-4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: September 26, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 11 - AOI4 LNAPL Thickness June 2013_9-26-13.mxd

APPENDIX A

Notice of Intent to Remediate and Report Notifications



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

October 12, 2006

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

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

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

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

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

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

Please call me at 610-859-1881 or email me at jroppenheim@sunocoinc.com with any questions or comments.

Best Regards,

James Oppenheim, PE
Sr. Environmental Consultant

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

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

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

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim

Title: Project Manager

Address: 100 Green Street
Marcus Hook, PA 19061

Telephone: (610) 859-1881

Email Address: jroppenheim@sunocoinc.com

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

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

October 12, 2006

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

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

Dear Sir/Madam:

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

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

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

Best Regards,

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

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

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

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

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim
Title: Project Manager
Address: 100 Green Street
Marcus Hook, PA 19061
Telephone: (610) 859-1881
Email Address: jroppenheim@sunocoinc.com

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

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

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

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

October 16, 2006

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

Anna Dickerson

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

Mary Anne Logan
Notary Public

My Commission Expires:

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

Copy of Notice of Publication

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

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

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

LEGAL NOTICES

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

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

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

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

Back

October 3, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

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

Re: Remedial Investigation Report
Area of Interest (AOI) 4
Philadelphia Energy Solutions (PES) Facility
Philadelphia, Philadelphia County, Pennsylvania
Langan Project No.: 2574601

Dear Sir/Madam:

Notice is hereby given that Sunoco, Inc. (R&M) (Sunoco) is in the process of submitting a Remedial Investigation Report to the Pennsylvania Department of Environmental Protection for AOI 4 located at the Philadelphia Energy Solutions Refining and Marketing LLC Facility, Philadelphia County, Philadelphia, PA. The report is being submitted in accordance with the site-specific remediation standards.

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

Please call me at (215) 446-2999 if you have any questions concerning the proposed remediation.

Sincerely,
Langan Engineering and Environmental Services, Inc.

Patrick Troy
Staff Geologist

cc: Jim Oppenheim, Sunoco
Charles Barksdale, PES
Jason Hanna, Langan

\\langan.com\data\DT\data6\2574601\Office Data\Reports\Repackaged SCR_RIR\AOI 4\Appendices\Appendix A - Notice of Intent\2013_1003_Philadelphia Department of Public Health_AOI 4 RIR Notices.docx

SENDER: COMPLETE THIS SECTION

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

1. Article Addressed to:

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

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

PHILA. PUBLIC HEALTH DESK
OCT 07 2013

3. Service Type
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☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7012 2210 0000 1978 8572

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

7012 2210 0000 1978 8572

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CHARLESTON SC 1890
OCT 4 2013

Sent To Manager
Street, Apt. No.; or PO Box No. Philadelphia Dept. of Public Health
City, State, ZIP+4 Environmental Health Services
321 University Avenue
Philadelphia, Pennsylvania 19104

PS Form 3800, August 2006 See Reverse for Instructions

October 3, 2013

VIA EMAIL- ADS@PHILLYNEWS.COM

Legal Advertising Department – Daily News
P.O. Box 8263 – 4th Floor
Philadelphia, PA 19101
Attn: Mary Anne Logan

Re: Remedial Investigation Report
Area of Interest (AOI) 4
Philadelphia Energy Solutions (PES) Facility
Philadelphia, Philadelphia County, Pennsylvania
Langan Project No.: 2574601

On behalf of Sunoco, Inc. (R&M), Langan Engineering and Environmental Services, Inc. requests that the following Public Notice be published in the Philadelphia Daily News under the legal notices section.

Notification of Submittal of a Remedial Investigation Report

Notice is hereby given that Sunoco, Inc. (R&M) *(remediator) is in the process of submitting a Remedial Investigation Report to the Pennsylvania Department of Environmental Protection (PADEP), Southeast Regional Office for Area of Interest 4 (AOI 4) located at the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Facility, Philadelphia County, Philadelphia, PA.*

The report is being submitted in accordance with the site-specific remediation standards established under the Land Recycling and Environmental Remediation Standards Act. This notice is made under the provision of the Land Recycling and Environmental Remediation Standards Act, the Act of May 19, 1995, P.L. #4, No. 2.

Please publish the notice as soon as possible and fax the proof of publication to me at (215) 491-6501. Please also mail the hard copy of the proof of publication and your invoice to my attention at the following address:

Langan Engineering & Environmental Services
Attn: Patrick Troy
30 S. 17th Street, Suite 1300, Philadelphia, PA 19103

Should you have any questions or comments regarding the request, please contact me at (215) 864.0640.

Sincerely,
Langan Engineering and Environmental Services, Inc.

Patrick Troy
Staff Geologist

cc: Jim Oppenheim, Sunoco
Charles Barksdale, PES
Jason Hanna, Langan

\\langan.com\data\DT\data6\2574601\Office Data\Reports\Repackaged SCR_RIR\AOI 4\Appendices\Appendix A - Notice of Intent\2013_1003_AOI 4_SCR_RIR Newspaper Notification.docx

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

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

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

October 7, 2013

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

Florence Devlin

Sworn to and subscribed before me this 7th day of October, 2013.

Mary Anne Logan
Notary Public

My Commission Expires:

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MARY ANNE LOGAN, Notary Public
City of Philadelphia, Phila. County
My Commission Expires March 30, 2017

Copy of Notice of Publication

Notification of Submittal of a Remedial Investigation Report

Notice is hereby given that Sunoco, Inc. (R&M) (remediator) is in the process of submitting a Remedial Investigation Report to the Pennsylvania Department of Environmental Protection (PADEP), Southeast Regional Office for Area of Interest 4 (AOI 4) located at the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Facility, Philadelphia County, Philadelphia, PA.

The report is being submitted in accordance with the site-specific remediation standards established under the Land Recycling and Environmental Remediation Standards Act. This notice is made under the provision of the Land Recycling and Environmental Remediation Standards Act, the Act of May 19, 1995, P.L. #4, No. 2.

APPENDIX B

Current and Historic Use Figures



Legend

- Current Use Areas
- Occupied Buildings Not Under Positive Pressure
- Area of Interest (AOI) Boundary
- 271 — Tank Closed in Place
- 270 — Tank With Release Assessment
- 846 — Closed in Place Following Release

Figure B-1: Current Use
AOI 4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure B-1 - Current Use_081413.mxd

AOI-2

AOI-1

AOI-4

AOI-3

N

W E

S

840 841 882 883

843 844 842 881

191 849

845 846 880

820 884 850

847 848 885

821 251 886

822 252

257 826

823 825

258

824 253

bing

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

Legend

882 Historic Tankage

Area of Interest (AOI) Boundary

Figure B-2: Historic Use
AOI 4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

SUNOCO

PHILADELPHIA ENERGY SOLUTIONS

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MH
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure B-2 - Historic Use_081413.mxd



Legend

- Impervious Surfaces
- Area of Interest (AOI) Boundary

Figure B-3: Impervious Surfaces
AOI 4 Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MH
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure B-3 - Impervious Surfaces_081413.mxd

APPENDIX C

Soil Boring Logs and
Monitoring Well Construction Summaries

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MONITORING WELL LOG: S-364

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	5 March 2013 (clrd) 18-19 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	0.0		(0-2') Sandy gravel, fill, some silt.	*Sample collected @ 0.5-1' for laboratory analysis		
	0.0		(2-4') Same as above.			
	429.7		(4-6') Brownish gray silty clay, some gravel, moist, odor.	*Sample collected @ 4-5' for laboratory analysis		
-5	420		(6-8') Same as above.			
	410		(8-10') Gravely sand, some silt.			
				Cleared to 10' via vac truck (samples collected by hand auger)		
-10	254		(10-12') Brownish green silty sand, with small gravel, wet, odor.		Bentonite/grout seal 0-14'	
	1056		(12-14') Brown sandy silt with small gravel, wet, strong odor.		PVC Surface Casing 0-15'	
	1051		(14-16') Brown sandy silt, with small gravel, wet, strong odor.			
-15	24.1		(16-18') Brown sandy silt with gravel, wet, odor.			
	702		(18-20') Brown sandy silt with small gravel, wet, strong odor.	Water encountered @ 18-19'. *Sample collected @ 19' for laboratory analysis		
-20	931		(20-22') Brown sandy silt with small gravel, wet, strong odor.		Sand 14-30'	
	1364		(22-24') Brown sandy silt with gravel, wet, very strong odor.			
	1284		(24-26') Brown sandy silt with gravel, wet, very strong odor.			
-25	770		(26-28') Brown sandy silt with gravel, wet, strong odor.		PVC Sreen 15-30'	
	911		(28-30') Brown sandy silt with gravel, wet, strong odor.			
-30						

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MONITORING WELL LOG: S-365

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4 March 2013 (clrd) 18 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-2') Orange - brown clay			
	0		(2-4') Dark gray, black clay	*Sample collected @ 0' - 2' for laboratory analysis		
-5	5.9		(4-10') Dark gray - black clay, strong odor.	*Sample collected @ 4' - 6' for laboratory analysis		
	250.9					
	35.8				PVC Surface Casing 0-15'	
-10	40.3		(10-14') Grey silty sand with small gravel, dry, no odor.			
	1.1			*Sample collected @ 12' - 14' for laboratory analysis	Bentonite/grout seal 0-14'	
	0.8		(14-16') Brownish grey sand silt with very small gravel, dry, no odor.			
-15	19.6		(16-18') Brownish red sand silt with small gravel, dry, odor.			
	197		(18-20') Brownish green sandy gravel, moist, odor.		Sand 14' - 30'	
-20	89.6		(20-22') Brownish green sandy gravel, wet, strong odor.			
	257		(22-24') Brownish green sandy silt with small gravel, wet, strong odor.		PVC Screen 15' - 30'	
	782		(24-26') Brownish green sandy silt with small gravel, wet, extremely strong odor.			
-25	948		(26-28') Grey sandy gravel, large gravel, wet, strong odor.			
	863		(28-30') Brownish green sand silt with small gravel, wet, strong odor.			
-30						

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MONITORING WELL LOG: S-366

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	5 March 2013 (cleared) 15 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	0.0		(0-2') Brown sandy gravel, fill.	*Sample collected @ 0-1' for laboratory analysis		
	0.1		(2-4') Brown sandy gravel, fill, some silt, trace clay.			
	15.7		(4-6') Gray clayey silt, trace gravel.	*Sample collected @ 4.5-5.5' for laboratory analysis		
-5	10.1		(6-8') Same as above.			
	5.4		(8-10') Same as above.			
-10	1.2		(10-12') Brownish tan sandy silt, dry, no odor.	Cleared to 10' via vac truck (samples collected by hand auger)	Bentonite/grout seal 0-14'	
	18.5		(12-14') Brownish gray sandy silt, dry, slight odor.		PVC Surface Casing 0-15'	
	20.3		(14-16') Brownish green silty sand with gravel, dry, slight odor.	*Sample collected @ 14-16' for laboratory analysis		
-15	114		(16-18') Brownish green silty sand with gravel, dry, odor.			
	726		(18-20') Brownish green silty sand with gravel, moist, strong odor.			
-20	582		(20-22') Brown silty sand with gravel, wet, strong odor, visible sheen.	Water encountered @ 21'.	Sand 14-30'	
	93.8		(22-24') Brown silty sand with gravel, wet, slight odor.			
	238		(24-26') Brown silty sand with fine gravel, wet, odor, sheen.		PVC Sreen 15-30'	
-25	138		(26-28') Brown silty sand with fine gravel, wet, odor.			
	253		(28-30') Brown sandy silt with fine gravel, wet, strong odor.			
-30						

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MONITORING WELL LOG: S-367

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	5 March 2013 (clrd) 13 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	28'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-2') Black, fill, gravel, silt, strong odor.			
	180.7		(2-4') Black clay some gravel (small), strong odor.	*Sample collected @ 0' - 2' for laboratory analysis		
	55.1		(4-6') Brown clay, moist.			
-5	33.1		(6-8') Dark brown clay, moist.			
	35.8		(8-10') Fill, black clay, wet.	*Sample collected @ 8' - 10' for laboratory analysis	PVC Surface Casing 0-13'	
-10	60.8		(10-12') Grey brown silty sand with small gravel. moist, odor.	*Sample collected @ 10' for laboratory analysis	Bentonite/grout seal 0-12'	
	244		(12-14') Blackish brown silty sand with small gravel, moist, slight odor.	*Sample collected @ 14' for laboratory analysis		
	158		(14-16') Greyish tan silty sand with large gravel, dry.	Depth to water 15.5'.		
-15	4		(16-18') Greyish brown silty sand with gravel, dry.			
	0		(18-20') Brownish grey silty sand with gravel, wet.		Sand 12' - 28'	
-20	14		(20-24') Brown/red silty sand with small gravel, wet, slight odor.		PVC Screen 13' - 28'	
	12					
	3		(24-26') Brown silty sand with small gravel, wet, no odor.			
-25	1		(26-28') Brown silty sand with very small gravel, wet, no odor.			

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MONITORING WELL LOG: S-368

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	5 March 2013 (clrd) 14 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	28'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-0.5') Gravel, fill	*Sample collected @ 0-1' for laboratory analysis		
			(0.5-2') Brown silty sand, some gravel.			
	0		(2-4') Brown clayey silt.			
	0		(4-6') Same as above.			
-5						
	0		(6-8') Gray silty clay.	*Sample collected @ 6-7' for laboratory analysis		
	49.9		(8-10') Same as above.			
				Cleared to 10' via vac truck (samples collected by hand auger)		
-10	24.9		(10-12') Brown/green silty sand, dry, slight odor.		Bentonite/grout seal 0-12'	
	76.7		(12-14') Brownish green silty sand, moist, slight odor.		PVC Surface Casing 0-13'	
	58.7		(14-16') Brownish black silty sand with gravel, dry, no odor.			
-15				*Sample collected @ 14' for laboratory analysis		
	5.8		(16-18') Black silty sand with small gravel, wet, strong odor.			
	77		(18-20') Blackish brown silty sand with small gravel, wet, strong odor.			
-20	156		(20-22') Brown silty sand with small gravel, wet, slight odor.		Sand 12'-28'	
	2.3		(22-24') Brown silty sand with gravel, wet, slight odor.			
	25.3		(24-26') Brownish gray silty sand with gravel, wet, strong odor.		PVC Screen 13-28'	
-25	57.3		(26-28') Brown silty sand with gravel, wet, strong odor.			
	90.3					

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MONITORING WELL LOG: S-369

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Shaun Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4 March 2013 (cleared) 2 April 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	42' (Well Depth - 40')	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-2') Dark/tan clay, sand and gravel			
	14.8		(2-4') Dark tan/brown clay, gravels	*Sample collected @ 0-2' for laboratory analysis		
	1.5		(4-6') Dark gray clay	*Sample collected @ 2-4' for laboratory analysis		
-5						
	0.5		(6-8') Dark tan clay	*Sample collected @ 6-8' for laboratory analysis		
	15.8		(8-10') Medium brown-tan clayey silt	*Sample collected @ 8-10' for laboratory analysis		
				Cleared to 10' via vac truck (samples collected by hand auger)		
-10	1.5		(10-12') 12" Recovery - Gray fine sandy clay (50% sand), moist	*Sample collected @ 11' for laboratory analysis	Bentonite/grout seal 0-18'	
	0.8		(12-14') 12" Recovery - Same as above, less sand with depth, moist		PVC Surface Casing 0-20'	
	0.7		(14-16') Full Recovery - Gray/tan clay, little fine sand, moist			
-15	0.5					
	0.4		(16-18') Full Recovery - Gray/orange fine sandy clay (10% sand), moist			
	0.2					
	0.3		(18-20') 6" Recovery - Same as above with reddish angular gravels			
-20	0.3		(20-22') 10" Recovery - Brown/red-brown medium sand and few mixed gravels			

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MONITORING WELL LOG: S-369

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
			(angular), dry to moist		Sand 18-40'	
	15.5		(22-24') Little Recovery - Brown/dark brown medium-coarse sand with few mixed gravels, moist			
	23.3		(24-26') 6" Recovery - Medium-coarse sand (red/gray/white/green) and mixed gravels, moist		PVC Sreen 20-40'	
-25						
	22.2		(26-28') 10" Recovery - Same as above			
	13.3		(28-30') 10" Recovery - Same as above			
-30	6.6		(30-32') 12" Recovery - Dark brown/black medium-coarse sand and mixed gravels (white,red), wet			
	410		(32-34') 8" Recovery - Red/brown/white/gray medium-coarse sand and mixed gravels, wet	*Sample collected @ 32' for laboratory analysis		
	1213		(34-36') Medium-coarse sand (dark gray/black) wtih few mixed gravels, wet			
-35						
	1118		(36-38') Full Recovery - Same as above			
	1207					
	1283		(38-40') Full Recovery - Same as above			
-40	1069		(40-42') Little Recovery - Same as above			

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MONITORING WELL LOG: S-370

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Shaun Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	1 March 2013 (cleared) 22 April 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	26' (Well Depth - 25')	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-2') Light brown clayey silt			
	0.0		(2-4') Light brown clayey silt	*Sample collected @ 0-2' for laboratory analysis		
	0.0		(4-6') Red/medium brown sand, silt, small gravels			
-5						
	0.0		(6-8') Red-dark brown clay, silt, gravels			
	1.8		(8-10') Dark brown sand, silt, gravel, strong odor	*Sample collected @ 8-10' for laboratory analysis	Bentonite/grout seal 0-8'	
-10	280.1		(10-12') 16" Recovery [10-11'] Medium-coarse sand and mixed gravels, moist [11-12'] Light gray fine to medium sand, trace clay, wet	Cleared to 10' via vac truck (samples collected by hand auger)	PVC Surface Casing 0-10'	
	167					
	155		(12-14') Full Recovery - Light gray fine to medium sandy clay (20-50% sand), moist/wet, few small gravels			
	139					
	155		(14-16') 6" Recovery - Same as above			
-15					Sand 8-25'	
	79.9		(16-18') Full Recovery - Light gray fine sand and clay (50-70% sand), moist			
	33.3					
	1.8		(18-20') Full Recovery [18-19'] Same as above [19-20'] Brown/gray fine sand with trace gray clay, wet			
	2.6					
-20	5.2		(20-22') Full Recovery - Gray/light gray fine sandy clay (50% sand) moist/wet		PVC Sreen 10-25'	

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MONITORING WELL LOG: S-370

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
	3.4					
	6.1		(22-24') Full Recovery - Brown/gray fine to medium sand and clay (60% sand), wet			
	5.9					
	6.7		(24-26') Full Recovery - Brown/gray fine sand, little clay, moist/wet			
-25	5.3					

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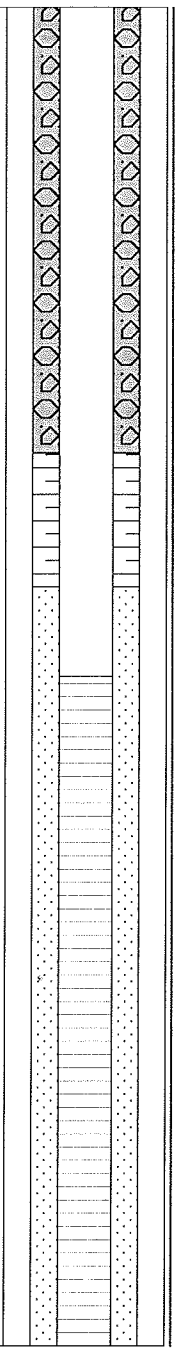
MONITORING WELL LOG: S-371

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Shaun Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4 March 2013 (cleared) 1 April 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	6.1		(0'-2') Brown silty sand, some gravel.	*Sample collected @ 1'-1.5' for laboratory analysis		
	24.6		(2' - 4') Brown clayey silt, trace sand.			
	6.9		(4'-6') Same as above.	*Sample collected @ 2'-3' for laboratory analysis		
-5	0.1		(6'-8') Gray clayey silt.			
			(8'-10') Same as above.	*Sample collected @ 5' - 8.5' for laboratory analysis	PVC Surface Casing 0 - 15'	
-10	0.1		(10'-12') Medium gray clay, compact, little fine to medium sand, moist.		Bentonite/grout seal 0 - 13'	
	0.3		(12'-14') Orange/brown/gray fine to medium sandy clay, moist.			
	0.5		(14'-16') Same as above, moist/wet.			
-15	3.5		(16' - 18') Tan/brown/gray fine-medium sandy clay, moist/wet.			
	1014		(18'-19') Gray medium-coarse sand, red/white rounded small gravels, wet.	*Sample collected @ 18' -20' for laboratory analysis	Sand 13'-30'	
	1213		(19' -20.5') Fine-medium yellow/brown sand, few small gravels, wet.	LNAPL present on spoon @ 19' - 20'	PVC Screen 15'-30'	
-20	765		(20.5'-22') Dark brown/tan/gray compact clay, moist/wet.			
	47.7		(22'-25') Dark brown/tan/gray clay, little sand and rounded gravels, moist/wet.			
	61.4		(25'-26') Medium-coarse sand and mixed gray/brown/red/white gravel			
	57.7		(26'-28') Same as above with gray/red/white gravel, wet.			
	103		(28'-30')Same as above with little gray clay, wet.			
-25	1257					
	1165					
	986					
-30						



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MONITORING WELL LOG: S-372

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	28 Feb. 2013 (clrd) 19 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	0.7		(1'-1.5') Silty clay, brown.	*Sample collected @ 1' - 1.5" for laboratory analysis		
-5	1.5		(6'-8') Clayey silt, brown, moist.	*Sample collected @ 6' - 8' for laboratory analysis	PVC Surface Casing 0 - 15'	
-10	2.5		(10'-12') Brown green sandy silt with gravel, dry, no odor.		Bentonite/grout seal 0 - 14'	
	9.5		(12'-14') Brown sandy silt with some gravel, dry, no odor.			
-15	5.7		(14'-16') Brown sandy silty with small gravel, dry, no odor.			
	2.5		(16'-18') Brown silty clay with small gravel, wet, no odor.			
	4.8		(18'-20') Brown sandy silt with small gravel, wet, no odor.			
-20	221		(20'-22') Brown sand gravel, wet, odor.		PVC Screen 15' - 30'	
	511		(22'-24') Brown sandy silt with gravel, wet, odor.		Sand 14' - 30'	
-25	751		(24'-26') Brown/black sandy silt with gravel, wet, strong odor.			
	528		(26'-28') Brownish black sandy silt with gravel, wet, odor.			
-30	445		(28'-30') Brown black sandy silt with gravel, wet, odor.			

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MONITORING WELL LOG: S-373

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hydroexcavation
JOB NO.:	-	SAMPLING METHOD:	Hand auger
LOGGED BY:	Luke Mokrycki	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	19-22 March 2013	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	25'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	11.2		(0-2') Orange brown clay.			
	193.7		(2-4') Dark gray clay.			
	492.0		(4-6') Dark gray, green clay.	*Sample collected @ 4-6' for laboratory analysis.		
-5	187.0		(6-8') Gray, green clay.		PVC Surface Casing 0-10'	
	373		(8-10') Brown coarse sand with small gravels.		Bentonite/grout seal 0-8'	
-10	328.0		(10-12') Brown coarse sand.			
				Soil samples were collected and logged to the extent of the hand auger.	PVC Sreen 10-25'	
-15						
					Sand 8-25'	
-20				Hydroexcavated to 20'.		
				2" steel well driven to 25' - Casing 0-15', Screen 15-25'		
-25						

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MONITORING WELL LOG: S-379

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	28 Feb. 2013 (cleared) 12 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0	0.0		(0'-2') Gravel, some sand, fill.	*Sample collected @ 0' - 2' for laboratory analysis	PVC Surface Casing 0 - 15'	
			(2' - 4') Brown clayey silt, some gravel.			
-5	9.8		(4'-6') Same as above, black stained.	*Sample collected @ 4' - 5' for laboratory analysis		
			(6'-7') Same as above.			
	0.0		(7'-9') Gray clayey silt, gravel, trace sand.	*Sample collected @ 8' - 9' for laboratory analysis		
-10			(9'-10') Same as above.		Bentonite/grout seal 0 - 13'	
	0.0		(12'-14') Gray brown slightly micaceous sand, moist, with fine sand.			
	0.0		(14'-16') Gray brown slightly micaceous sand with fine gravel, moist.			
-15	2.1		(16' - 18') Gray brown slightly micaceous sand with fine gravel, dry.			
	30		(18'-20') Brown slightly micaceous sand with very fine gravel, dry, odor.		Sand 13'-30'	
-20	140		(20'-22') Brown slightly micaceous sand with large gravel, wet, odor.		PVC Screen 15'-30'	
			(22'-24') Hard compacted layer of gravel with some sand, dry.			
	0.0		(24'-26') Gravel with some sand, wet.			
-25	0.2		(26'-28') Gravel with some sand, wet.			
	20.2		(28'-30) Gravel with some sand, wet, odor.			
-30						

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MONITORING WELL LOG: S-380

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Luke Mokrycki/Evan Ellwanger	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	1 March 2013 (cleared) 20 March 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	30'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-2') Orange - brown clay, some gravel.			
	0.1		(2-4') Orange- brown clay, moist.	*Sample collected @ 0' - 2' for laboratory analysis		
	0.1		(4-6') Brown clay.			
-5						
	0		(6-8') Medium brown clay, moist.			
	0		(8-10') Light - brown clay, moist.	*Sample collected @ 8' - 10' for laboratory analysis	PVC Surface Casing 0 - 15'	
-10						
	0		(10-12') Brown sandy silt, wet, no odor.		Bentonite/grout seal 0 - 14'	
			(12-14') Brown black silty sand, dry, no odor.			
			(14-18') Brown black silty sand with small gravel, dry, no odor.			
-15						
			(18-20') Brown silty sand with gravel, moist, no odor.		Sand 14' - 30'	
-20			(20-22') Brown silty sand with gravel, wet, no odor.		PVC Screen 15' - 30'	
			(22-24') Brown black sandy silt with large gravel, wet, no odor.			
			(24-26') Brown green sandy silt with gravel, wet, no odor.			
-25						
			(26-28') Brown tan silty sand, wet, no odor.			
			(28-30) Clay-silt, tan, wet, no odor.			
-30						

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MONITORING WELL LOG: S-381

PROJECT:	Sunoco - Philadelphia Refinery	DRILLING CO.:	Badger / Total Quality Drilling
SITE LOCATION:	AOI-4	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:	-	SAMPLING METHOD:	Split Spoon
LOGGED BY:	Pat Troy/Shaun Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	15 March 2013 (cleared) 25 April 2013 (drilled)	WELLBORE DIAMETER:	8"
TOTAL DEPTH:	32'	ELEVATION:	-

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			(0-0.6') Sandy silt grey			
			(0.6' - 1') Tank dike material.	*Sample collected @ 0' - 0.6' for laboratory analysis		
	0.0		(2' - 4') Clayey silt, dark grey.	*Sample collected @ 2' - 4' for laboratory analysis		
	533.1		(4'-6') Clayey silt, dark grey.	*Sample collected @ 4' - 6' for laboratory analysis		
-5						
	109.5		(6'-8') Clayey silt, dark grey.	*Sample collected @ 6' - 8' for laboratory analysis		
	35.0		(8'-10') Groundwater, may be perched.		PVC Surface Casing 0 - 17'	
-10			(10'-12') Orange/gray fine sandy clay, compact (20 - 30% sand), slightly moist.		Bentonite/grout seal 0 - 15'	
	4.1					
	2.2		(12'-14') Gray fine sand, clay (50% sand), moist.	*Sample collected @ 12' for laboratory analysis		
	156		(14'-16') Medium coarse sand, mixed gravels, little clay, moist - wet. Gravels mostly rounded, gray/white.			
-15						
	215		(16' - 18') Fine - medium sand and large rounded gravels, moist, dark gray/red/white.			

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MONITORING WELL LOG: S-381

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
	141		(18'-20') Fine - medium sand and large rounded gravels, moist, dark gray/red/white.		Sand 15' - 32'	
-20	181		(20'-22') Reddish brown fine-medium sand and few rounded gravels (large), moist.		PVC Screen 17' - 32'	
	369		(22'-24') Dark gray/dark green medium-coarse sand and gravels, rounded - white/red/gray, wet. Clear LNAPL			
	565					
	676		(24'-26') Dark gray/black medium-coarse sand and mixed gravels, large, wet. Clear LNAPL.	*Sample collected @ 24' for laboratory analysis		
-25	680					
	614		(26'-28') Dark gray/black medium-coarse sand and mixed gravels, large, wet.			
	731					
	605		(28'-30) Gray/dark gray medium-coarse sand and gravels (white,gray, red), wet.			
-30	246		(30'-32') Gray fine-medium sand and few mixed gravels (white,gray, red), wet.			

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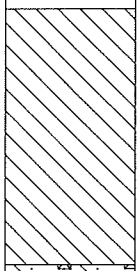
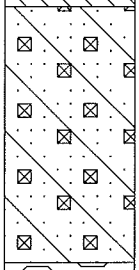
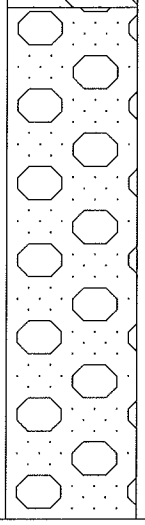
SUBSURFACE BORING LOG

BOREHOLE NO. **BH-13-81**

Page 1 of 1

PROJECT:	**Sunoco - Philadelphia Refinery**	DRILLING CO.:	**Badger**
SITE LOCATION:	**AOI-4**	DRILLING METHOD	**Hydroexcavation**
JOB NO.:		SAMPLING METHOD	**4" Hand auger**
LOGGED BY:	**Luke Mokrycki**	TOTAL DEPTH:	**10'**
DATES DRILLED:	**3/20/13**		

DEPTH (feet)	SAMPLE INTERVAL	PID (ppm)	LITHOLOGY DESCRIPTION	LITH-OLOGY	COMMENTS
0			(2'-4') Dark brown clay.		
		3.4	(4' - 6') Dark brown clay with small gravels.		
-5		2.3	(6' - 8') Brown coarse sand and samll gravels.		
	*Sample collected at 8' - 10' by hand auger for laboratory analysis.	4.0	(8' 10') Red-brown coarse sand with small gravels.		Boring terminated at 10'.
-10					

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SUBSURFACE BORING LOG

BOREHOLE NO. **BH-13-90**

Page 1 of 1

PROJECT:	**Sunoco - Philadelphia Refinery**	DRILLING CO.:	**Badger**
SITE LOCATION:	**AOI-4**	DRILLING METHOD	**Hydroexcavation**
JOB NO.:		SAMPLING METHOD	**4" Hand auger**
LOGGED BY:	**Luke Mokrycki**	TOTAL DEPTH:	**10'**
DATES DRILLED:	**3/15/13**		

DEPTH (feet)	SAMPLE INTERVAL	PID (ppm)	LITHOLOGY DESCRIPTION	LITH-OLOGY	COMMENTS
0					
		0.7	(2'-4') Loose gray-brown clay.		
		0.7	(4' - 6') Orange-brown clay.		
-5					
		1.2	(6' - 8') Gray-red clay.		
	*Sample collected at 8' - 10' by hand auger for laboratory analysis.	1.8	(8' 10') Brown-gray clay with small gravels..		Boring terminated at 10'.
-10					

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SUBSURFACE BORING LOG

BOREHOLE NO. **BH-13-91**

Page 1 of 1

PROJECT:	**Sunoco - Philadelphia Refinery**	DRILLING CO.:	**Badger**
SITE LOCATION:	**AOI-4**	DRILLING METHOD	**Hydroexcavation**
JOB NO.:		SAMPLING METHOD	**4" Hand auger**
LOGGED BY:	**Luke Mokrycki**	TOTAL DEPTH:	**10'**
DATES DRILLED:	**3/14/13**		

DEPTH (feet)	SAMPLE INTERVAL	PID (ppm)	LITHOLOGY DESCRIPTION	LITH-OLOGY	COMMENTS
0	*Sample collected at 0-2' by hand auger for laboratory analysis.	3.4	(0-2') Brown clay and small gravels.		
		1.8	(2'-4') Dark brown clay with small gravels.		
		1.8	(4' - 6') Brown black fine sands.		
-5		2.2	(6' - 8') Gray green clay with small gravels.		
	*Sample collected at 8' - 10' by hand auger for laboratory analysis.	2.8	(8' 10') Brown gravel and coarse sands, moist.		Boring terminated at 10'.
-10					

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SUBSURFACE BORING LOG

BOREHOLE NO. **BH-13-92**

PROJECT:	**Sunoco - Philadelphia Refinery**	DRILLING CO.:	**Badger**
SITE LOCATION:	**AOI-4**	DRILLING METHOD	**Hydroexcavation**
JOB NO.:		SAMPLING METHOD	**4" Hand auger**
LOGGED BY:	**Luke Mokrycki**	TOTAL DEPTH:	**10'**
DATES DRILLED:	**3/18/13**		

DEPTH (feet)	SAMPLE INTERVAL	PID (ppm)	LITHOLOGY DESCRIPTION	LITH-OLOGY	COMMENTS
0			(2'-4') Gray - tan clayey silt.		
		0	(4' - 6") Medium brown clay, loose.		
-5		0	(6' - 8') Medium brown, cohesive clay.		
	*Sample collected at 8' - 10' by hand auger for laboratory analysis.	0.3	(8' 10') Red-brown gravelly clay, some sands.		
-10					

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SUBSURFACE BORING LOG

BOREHOLE NO. **BH-13-94**

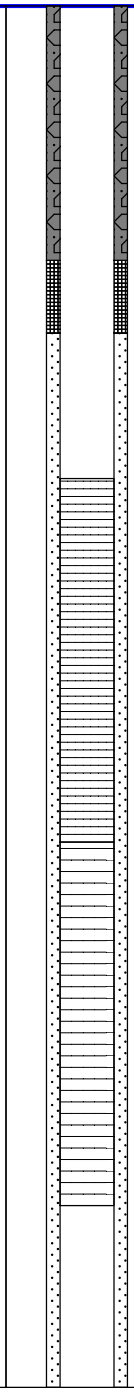
PROJECT:	**Sunoco - Philadelphia Refinery**	DRILLING CO.:	**Badger**
SITE LOCATION:	**AOI-4**	DRILLING METHOD	**Hydroexcavation**
JOB NO.:		SAMPLING METHOD	**4" Hand auger**
LOGGED BY:	**Luke Mokrycki**	TOTAL DEPTH:	**10'**
DATES DRILLED:	**3/15/13**		

DEPTH (feet)	SAMPLE INTERVAL	PID (ppm)	LITHOLOGY DESCRIPTION	LITH-OLOGY	COMMENTS
0	*Sample collected at 0-2' by hand auger for laboratory analysis.	0.7	(0-2') Loose brown clay.		
		0.2	(2'-4') Loose brown clay, small gravel.		
		0.5	(4' - 6') Brown and gray clay, cohesive.		
-5		0.7	(6' - 8') Gray and brown clay.		
	*Sample collected at 8' - 10' by hand auger for laboratory analysis.	2.8	(8' 10') Gray clay.		Boring terminated at 10'.
-10					

MONITORING WELL LOG: RW-700

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-1 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/27/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**38'**	ELEVATION:	**N/A**

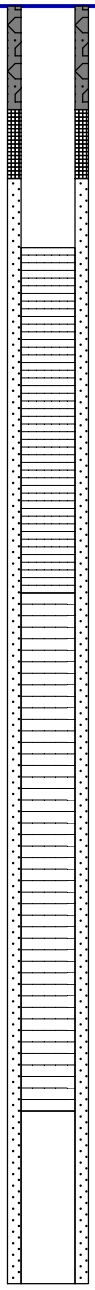
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled.	Hand cleared to 8'		
				No soil samples collected		
-5					13' PVC Riser	
			Little recovery - backfill sand			
-10	14.5		50% recovery - gray/orange sandy silt, stiff, moist, sl odor			
	38.1					
	10.9		Same with fine gravels to 15'			
	24.7					
	29.9					
-15	327		Brown/red/gray fine/med sands and large gravels, moist, strong odor		10' of 0.01-slot screen	
	1358					
	7200					
	1369		Same to 30' - wet at 18'.			
	1776					
-20	1312					
	1201		50% recovery - med brown silty sands and gravels, wet strong vapors			
	704					
	408					
	819					
-25	643				10' of 0.02-slot screen	
	405					
	312					
				Hollow stem auger terminal depth = 38'		
-30	7200		Tan/brown sand and mixed gravels, wet, strong odor, some clay			
	1330					
	1227		Same, increased clay content			
	1043					
	7200					
-35	1039		Tan/gray sandy clay, some gravels - same to 38'		5' solid PVC Riser for sump	
	889					
	791					



MONITORING WELL LOG: RW-701

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-2 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/25/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**37'**	ELEVATION:	**N/A**

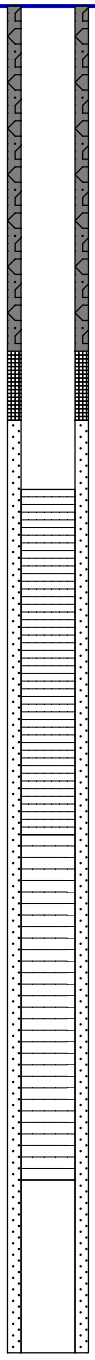
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					7' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						



MONITORING WELL LOG: RW-702

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-3 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/25/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**39'**	ELEVATION:	**N/A**

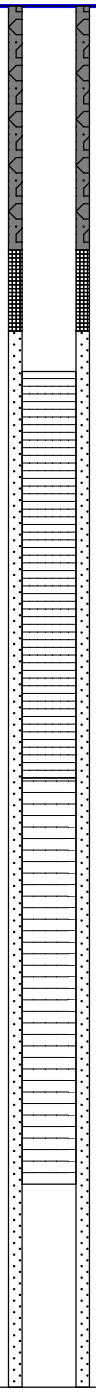
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					14' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					10' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						



MONITORING WELL LOG: RW-703

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-4 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/24/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**34'**	ELEVATION:	**N/A**

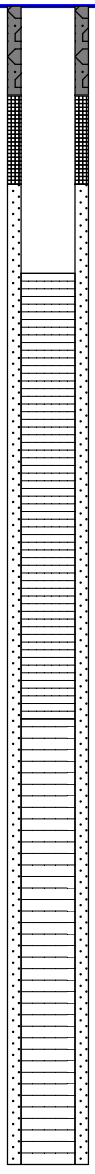
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled.	Hand cleared to 8'		
			Hollow stem auger to depth - no split spoon samples.	No soil samples collected		
-5					9' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					10' of 0.02-slot screen	
-30			Refusal interpreted to be on large gravel/cobble of Trenton Gravel.	Hollow stem auger terminal depth = 34' (refusal)	5' of solid riser (bottom sump)	



MONITORING WELL LOG: RW-704

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-5 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/25/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**26'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled.	Hand cleared to 8'		
			Hollow stem auger to depth - no split spoon samples.	No soil samples collected		
-5					6' PVC Riser	
-10					10' of 0.01-slot screen	
-15						
-20					10' of 0.02-slot screen	
-25						
-30			Auger refusal at 31' interpreted to be on large gravel/cobble of Trenton Gravel.	Hollow stem auger terminal depth = 31' (refusal)		



MONITORING WELL LOG: RW-705

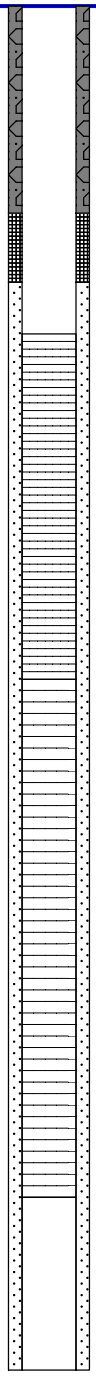
PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-6 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**10/5/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**38'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled.	Hand cleared to 8' No soil samples collected		
-5					8' PVC Riser	
	0.0		25% recovery - some backfilled sand; lt brown sandy silt.			
	0.0					
-10	5.6		50% recovery - lt brown med sandy silt, stiff, sl odor, some fine gravels - Same to 16'			
	10.9					
	16.2					
	19.3					
	32.6					
-15	73.3				10' of 0.01-slot screen	
	127		25% recovery - brown/gray/white/red fine-med sands and silt with mixed gravels, moist			
	303					
	356					
	313		Same as above - wet - STRONG vapors (switch to supplied air)			
-20	297					
	289		50% recovery - med brown silty sands and gravels, wet strong vapors			
	315					
	263					
	212		Same to 40' (trace clay at 36'-40')			
-25	202				15' of 0.02-slot screen	
	193					
	212					
	165					
	173			Hollow stem auger terminal depth = 40'		
-30						
	209					
	201					
	217					
-35	253				5' solid PVC Riser for sump	
	176					
	143					
	127					
-40	115					

MONITORING WELL LOG: RW-706

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-7 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**10/4/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**39.5'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					9.5' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20				High vapors - switch to supplied air at 20'.		
-25					15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						



MONITORING WELL LOG: RW-707

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-8 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**8/31/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**36.5'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					11.5' PVC Riser	
-10			Fill, dark brown sandy silt to 16'			
-15					10' of 0.01-slot screen	
-20			16'-22' - large gravels and sand			
-25			22'-26' - large gravels and sand, wet		10' of 0.02-slot screen	
-30			26'-40' - wet, medium brown sand and gravels, some silt/clay, odor/vapors	Hollow stem auger terminal depth = 40'		
-35					5' of solid riser (bottom sump)	
-40						

MONITORING WELL LOG: RW-708

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-9 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/1-2/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**38'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 9' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 9'		
-5				No soil samples collected		
				NOTE: PID readings are from breathing space during drilling (not soil).	13' PVC Riser	
-10	0.1					
	0.0					
	0.0					
-15				Hollow stem auger terminal depth = 40'	10' of 0.01-slot screen	
	3.2					
	304					
-20	76.9					
	337					
	380		Heavy odors and high PID readings in breathing space. Benzene measurements ~370ppm. Stop and switch to Level B work.			
-25					10' of 0.02-slot screen	
	210					
	330					
-30	20					
-35	267				5' of solid riser (bottom sump)	
-40	270					

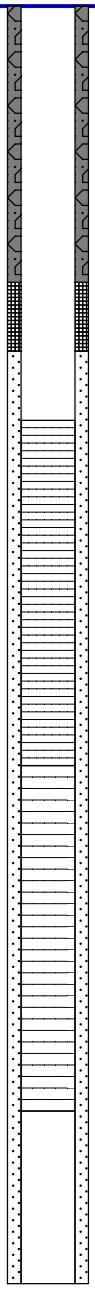
MONITORING WELL LOG: RW-709

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-10 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/2/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**38'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 10' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 10'		
-5				No soil samples collected		
				NOTE: PID readings are from breathing space, not soil.	13' PVC Riser	
-10						
	24.1					
	16.9					
-15				Hollow stem auger terminal depth = 40'	10' of 0.01-slot screen	
	3.4					
	4.2					
-20						
	12					
	50					
	19		Heavy odors and high PID readings in breathing space.			
-25					10' of 0.02-slot screen	
	120					
	308					
-30						
	306					
	647					
	230					
-35					5' of solid riser (bottom sump)	
	303					
	350					
-40						

MONITORING WELL LOG: RW-710

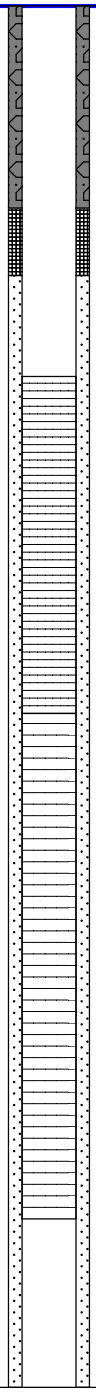
PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-11 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/3-7/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**37'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 9' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 9'		
-5				No soil samples collected		
				NOTE: PID readings are from breathing space, not soil.	12' PVC Riser	
-10	5.8					
	1.7					
	1.6					
-15				Hollow stem auger terminal depth = 40'	10' of 0.01-slot screen	
	1.0					
	3.5					
-20	8.7					
	10.6					
	15.7					
-25					10' of 0.02-slot screen	
-30						
-35					5' of solid riser (bottom sump)	
-40						

MONITORING WELL LOG: RW-711

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-12B in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/21/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**41'**	ELEVATION:	**N/A**

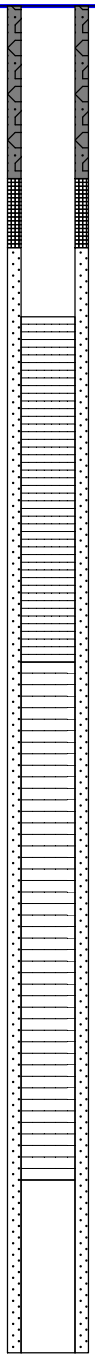
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					11' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 41'		
-35					5' solid PVC Riser for sump	
-40						



MONITORING WELL LOG: RW-712

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-12A in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/21/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**39'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					9' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						



MONITORING WELL LOG: RW-713

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-13 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/7/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**37'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					12' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20			18'-20' - brown/dk brown sandy silt and gravel, dry to 17'. Odors at 17'. 20'-30' - wet, dk brown silty sand, strong odors/vapors Note: shut down temporarilly due to high vapor concentrations (above LEL).			
-25					10' of 0.02-slot screen	
-30				Hollow stem auger terminal depth noted as 30' (not refusal - set shallow due to high vapors) in notes. Well gauged at 37' bgs.		
-35					5' of solid riser (bottom sump)	

MONITORING WELL LOG: RW-714

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-14 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/8/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**37'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					12' PVC Riser	
-10			"Gravels, sand, silty sand" described for whole column			
-15					10' of 0.01-slot screen	
-20						
-25					10' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						

MONITORING WELL LOG: RW-715

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-15 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/15/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**40'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					10' PVC Riser	
-10			8'-25' - Brown fine sandy silt, wet at 16' (30-399 ppm breathing zone)			
-15					10' of 0.01-slot screen	
-20						
-25			25'-40' - Med brown sand and silt, trace clay, odor (100-300 ppm breathing zone)		15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						

MONITORING WELL LOG: RW-716

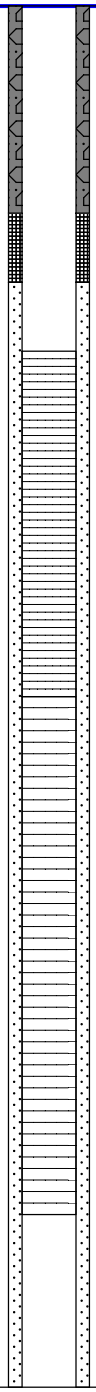
PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-16 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/16/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**40'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					10' PVC Riser	
-10			8'-20' - Brown fine sandy silt, wet at 16' (5-101 ppm breathing zone)			
-15					10' of 0.01-slot screen	
-20			20'-25' - Color change to red-brown, trace clay, very moist, no odor (0-13 ppm breathing zone)			
-25			25'-40' - Wet, brown/gray fine/med sand, less silt with depth (0-5 ppm breathing zone)		15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						

MONITORING WELL LOG: RW-717

PROJECT:	**Sunoco-Marcus Hook Refinery**	DRILLING CO.:	**Total Quality Drilling**
SITE LOCATION:	**AOI-4/Penrose Ave**	DRILLING METHOD:	**Hollow Stem Auger**
JOB NO.:	**RW-17 in field notes**	SAMPLING METHOD:	**Split Spoon**
LOGGED BY:	**Shaun Sykes**	SCREEN/RISER DIAMETER:	**4"**
DATES DRILLED:	**9/17/2010**	WELLBORE DIAMETER:	**6"**
TOTAL DEPTH:	**40'**	ELEVATION:	**N/A**

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Hole cleared to 8' and backfilled. Hollow stem auger to depth - no split spoon samples.	Hand cleared to 8' No soil samples collected		
-5					10' PVC Riser	
-10						
-15					10' of 0.01-slot screen	
-20						
-25					15' of 0.02-slot screen	
-30				Hollow stem auger terminal depth = 40'		
-35					5' solid PVC Riser for sump	
-40						



Aquaterra Technologies, Inc.
Subsurface Log: S-216

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-216 **Log By:** M.B. Spancake **Date:** 19-Apr-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 16'
Casing Diameter: 4 inch **Length:** 20.5 **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 26' bgs **Backfill:** 0'-7'
Screen Interval: 11'-26' **Cement/Grout Interval:**
Sand Pack Interval: 9'-26' **Bentonite Interval:** 7'-9'
Completion Details: 3' stick up **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 10' BGS and begin continuous	
	1'-1.5'			Hand auger to 1.5' BGS to collect soil sample on 3/25/05.	
				Advance augers to 10' BGS and begin continuous split spoons	
5					
10	10-12	21	1.5 6-7-9-8	Brown coarse sand and poorly sorted gravel, slight reddish color and slight moisture	
	12-14	21	1 8-15-9-10	Same as above, more red in color.	
	14-16	263	0.75 8-11-17-21	Reddish brown coarse sandy gravel, poorly sorted. Moist to wet.	
15	16-18	292	1.75 23-13-13-18	Same as above, wet.	
	18-20	358	1 11-14-13-10	Same as above.	
20	20-22	318	1.25 6-8-10-12	Same as above	
	22-24	258	1.75 4-6-10-12	Same as above. Gravel is becoming larger. Large pebble in bottom of spoon	
	24-26	NA	0 50 / 0.4	No recovery. Advance to 26' BGS and set well.	
25					

Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-217

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-217 **Log By:** M.B. Spancake **Date:** 29-Mar-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** NA
Casing Diameter: 4 inch **Length:** 15' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 27' bgs **Backfill:** 0'-7'
Screen Interval: 12'-27' **Cement/Grout Interval:**
Sand Pack Interval: 10'-27' **Bentonite Interval:** 7'-10'
Completion Details: 3' stickup **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'**			Soft dig to 7' BGS. Hand auger to 1.5' BGS to collect soil sample on 4/1/05. Sample collected 5' from well location Advance augers to 10' below ground surface and begin split spoons every 5 feet.	
5				No lithology recorded. Driller indicated spoons recovered a sandy gravel matrix. Some spoons had more sand, some had more gravel.	
10	10-12	NA			
15	15-17	NA			
20	20-22	NA			
25	25-27	NA		Well set at 27' BGS.	

Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-218

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-218 **Log By:** M.B. Spancake **Date:** 20-Apr-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 25'
Casing Diameter: 4 inch **Length:** 18' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 30' bgs **Backfill:** 0-11'
Screen Interval: 15'-30' **Cement/Grout Interval:**
Sand Pack Interval: 13'-30' **Bentonite Interval:** 11-'13'
Completion Details: 3' Stick up **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 10' BGS Advance augers to 10' below ground surface and begin split spoons every 5 feet.	
5					
10	10-12	NA	1.5 1-2-3-3	Moist to wet gray clayey silt, some fine sand	
15	15-17	NA	0.75 21-12-13-16	Gray coarse sandy gravel, slightly moist. Gravel is small.	
20	20-22	NA	1.25 20-17-15-15	Reddish brown coarse sandy gravel, slightly moist.	
25	25-27	NA	1 6-5-6-16	Wet brown medium sand and silt, some small gravel. Advance augers to 30' BGS and set well	
30					

Note: PID not working, therefore no readings available.

Aquaterra Technologies, Inc.
Subsurface Log: S-219

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-219 **Log By:** M.B. Spancake **Date:** 25-Mar-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 16'
Casing Diameter: 4 inch **Length:** 15' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 27' bgs **Backfill:** 0'-7'
Screen Interval: 12'-27' **Cement/Grout Interval:**
Sand Pack Interval: 10'-27' **Bentonite Interval:** 7'-10'
Completion Details: 3' Stick up **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Recovery (ft) / Blow Count	Lithology	Well Schematic
0	**1-1.5**			Soft dig to 10' BGS Hand auger to 1.5' BGS to collect soil sample.	
5				Advance augers to 10' below ground surface and begin split spoons every 5 feet.	
10	10-12	0	1 7-8-9-13	Brownish gray medium sand and some small gravel and pebble. Slightly moist	
15	15-17	0	1.5 4-4-4-5	Gray and brown silty clay, moist. Lense of wet fine sand and gravel at 16' BGS. Changing to a brown orange silty clay.	
20	20-22	0	0.5 10-9-9-9	Wet gray medium sandy gravel changing to a brown silty clay.	
25	25-27	0	1 8-13-13-11	Brown silty clay, moist. Changing to a coarse tan sandy gravel.	
30	30-32		2	Tan clay in top 6" of spoon changing to a medium to fine tan sand, wet. Set well at 27' BGS. Backfilled 27' - 32' with bentonite chips	

Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-220

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-220 **Log By:** M.B. Spancake **Date:** 20-Apr-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 20'
Casing Diameter: 4 inch **Length:** 18' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 30' bgs **Backfill:** 0'-10'
Screen Interval: 15'-30' **Cement/Grout Interval:**
Sand Pack Interval: 13'-30' **Bentonite Interval:** 10'-13'
Completion Details: 3-foot Stickup **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Recovery (ft) / Blowcount	Lithology	Well Schematic
0	**1'-1.5'**			Soft dig to 10' BGS Hand auger to 1.5' BGS to collect soil sample on 4/1/05. Advance augers to 10' below ground surface and begin split spoons every 5'	
5					
10	10-12	NA	NA 7-7-3-3	Dry brown coarse sand and small gravel	
15	15-17	NA	NA 6-4-6-4	Same as above	
20	20-22	NA	NA 5-4-4-4	Wet grayish green coarse sandy gravel changing to a brown silt, moist and stiff	
25	25-27	NA	NA 2-4-6-6	Tan and brown clayey silt. Some fine to medium sand, slightly moist Advance augers to 30' BGS and set well.	
30					

Note: PID not working, therefore no readings available.
Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-221

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-221 **Log By:** M.B. Spancake **Date:** 21-Apr-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 22'
Casing Diameter: 4 inch **Length:** 18' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 30' bgs **Backfill:** 0'-10'
Screen Interval: 15'-30' **Cement/Grout Interval:**
Sand Pack Interval: 13'-30' **Bentonite Interval:** 10'-13'
Completion Details: 3' Stick up **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'			Hand auger to 2' BGS to collect soil sample on 3/25/05.	
				Advance augers to 10' BGS and begin continuous split spoons	
5					
10	10-12	21	2 5-8-11-15	Wet gray clayey silt and some small gravel in top 6" Change to a stiff reddish brown clay, slightly moist.	
	12-14	NA	1.5 12-14-20-22	Stiff reddish brown silty clay, slight moisture	
	14-16	463	0.5 8-9-9-6	Slightly moist brown coarse sand and medium sized gravel.	
15					
	16-18	390	1 15-11-12-21	Fine and medium brown sand, some small gravel. Changing to a fine gray sand in bottom 4". Moist.	
	18-20	920	0.75 13-12-12-10	Wet coarse sandy gravel, large pebbles present. Gray in color. Large pebble in shoe of spoon.	
20	20-22	NA	0 9-11-15-16	No Recovery	
	22-24	920	1.25 19-17-17-18	Wet reddish brown and gray coarse sand and medium to large poorly sorted gravel	
	24-26	801	1 5-4-3-5	Medium and coarse brown sand, wet.	
25					
	26-28	824	1.25 7-5-7-8	Same as above.	
	28-30	974	1.75 7-9-10-15	Same as above. Advance augers to 30' BGS and set well.	
30					

Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-222

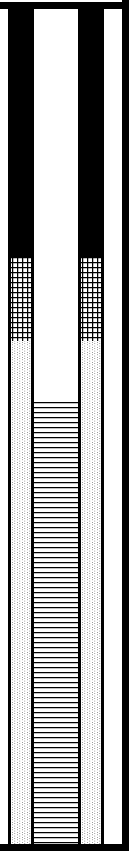
Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-222 **Log By:** M.B. Spancake **Date:** 9-Jun-05
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** NA
Casing Diameter: 4 inch **Length:** 13' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 28' bgs **Backfill:**
Screen Interval: 13'-28' **Cement/Grout Interval:** 0'-8'
Sand Pack Interval: 11'-28' **Bentonite Interval:** 8'-11'
Completion Details: Flushmount with manhole **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 28' BGS and set well' Cuttings were brown silt and gravel No lithology recorded	
5					
10					
15					
20					
25					

Aquaterra Technologies, Inc.
Subsurface Log: S-223

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-223 **Log By:** M.B. Spancake **Date:** 8-Jun-05
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** NA
Casing Diameter: 4 inch **Length:** 15' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 30' bgs **Backfill:**
Screen Interval: 15'-30' **Cement/Grout Interval:** 0'-10'
Sand Pack Interval: 13'-30' **Bentonite Interval:** 10'-13'
Completion Details: Flushmount with manhole **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 30' BGS and set well'	
				Cuttings were brown silt and gravel	
5				No lithology recorded	
10				Augers grinding from 12'- 17' BGS. Cuttings are brown sandy silt anc coarse gravel	
15					
20				Wet cuttings at 20' BGS	
25					
30				Well set at 30' BGS	

Aquaterra Technologies, Inc.
Subsurface Log: S-224

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-224 **Log By:** M.B. Spancake **Date:** 6-Jun-05
Casing Elevation: N/A **Driller:** Total Quality Drilling **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 20' **Slot Size:** 0.02 **Water Level (Init):** NA
Casing Diameter: 4 inch **Length:** 12' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 32' bgs **Backfill:**
Screen Interval: 12'-32 **Cement/Grout Interval:** 0'-8'
Sand Pack Interval: 10'-32' **Bentonite Interval:** 8'-10'
Completion Details: Flushmount with manhole **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 32' BGS and set well	
5				No lithology recorded	
10					
15					
20					
25					
30					

Aquaterra Technologies, Inc.

Subsurface Log: S-225

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-225 **Log By:** M.B. Spancake **Date:** #
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25"
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 17'
Casing Diameter: 4 inch **Length:** 15' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 27' bgs **Backfill:** 0'-7'
Screen Interval: 12'-27' **Cement/Grout Interval:**
Sand Pack Interval: 10'-27' **Bentonite Interval:** 7'-10'
Completion Details: 3' Stick up **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 10' BGS Advance augers to 10' below ground surface and begin split spoons every 5 feet.	
5					
10	10-12	280	1'	Tight brown sandy silt with small gravel. Slight staining present. Becoming more sandy towards bottom.	
15	15-17	326	0.75'	Reddish brown silt with coarse sandy gravel. Moist. Becoming wet towards bottom.	
20	20-22	362	1.25'	Wet brownish red coarse sandy gravel.	
25	25-27	26	2'	Wet gray clayey sand. Sand is fine grain. Slight color change to brown-gray at 26.5' BGS. Set well at 27' BGS.	

Aquaterra Technologies, Inc.
Subsurface Log: S-229

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-229 **Log By:** M.B. Spancake **Date:** 23-Mar-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 4 inch **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 20'
Casing Diameter: 4 inch **Length:** 15' **Type:** PVC
Drilling Method: Hollow Stem Auger **Sample Method:** Split Spoon **Rig Type:** HSA Rig

Construction Details

Total Well Depth: 30' bgs **Backfill:** 0-10'
Screen Interval: 15'-30' **Cement/Grout Interval:**
Sand Pack Interval: 13'-30' **Bentonite Interval:** 10'-13'
Completion Details: 3' Stick up **Sand Pack Type:** #2

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Recovery (ft) / Blow Count	Lithology	Well Schematic
0				Soft dig to 10' BGS	
	1.5'-2'			Hand auger to 2' BGS to collect soil sample.	
				Advance augers to 10' below ground surface and begin continuous split spoons	
5					
10	10-12	0	0.5	Rock fragments in a brown sand and silt matrix, dry.	
			2-2-5-5		
12	12-14	0	1	Same as above, slight moisture	
			6-6-7-8		
14	14-16	0	1	Same as above	
			3-6-13-20		
16	16-18	11	1	Dry coarse sandy gravel	
			16-21-20-23		
18	18-20	14	0.5	Same as above, more large gravel and rock fragments present.	
			25-16-14-12		
20	20-22	NA	0.25	Wet brown gray sand, SPP present	
			3-2-4-5		
22	22-24	NA	1.25	Wet poorly sorted coarse sandy gravel changing to a fine to medium gray	
			7-12-12-12	brown sand towards bottom. SPP present	
24	24-26	NA	1.5	Same as above, lense of fine to medium brown gray sand in bottom.	
			2-2-5-15		
26	26-28	NA	1	Wet coarse sandy gravel, poorly sorted, brownish gray in color.	
			31-17-33-16		
28	28-30	NA	2	Same as above	
			13-19-23-40	Set well at 30' BGS	
30					

No PID readings after 20' due to heavy rain.
Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-119D

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-119D **Log By:** M.B. Spancake **Date:** 3/22/05 & 4/7/05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 2" **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 57
Casing Diameter: 2" **Length:** 57' **Type:** PVC
Drilling Method: Hollow Stem Auger/ Mud Rotary **Sample Method:** Split Spoon **Rig Type:** HSA Rig/Mud Rotary

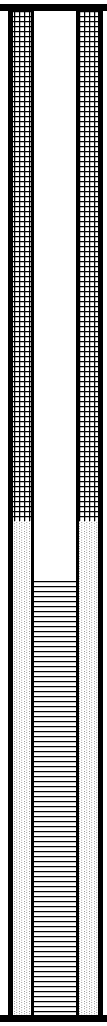
Construction Details

Total Well Depth: 72' BGS **Bentonite Interval:** 0-55'
Screen Interval: 57'-72' **Cement/Grout Interval:**
Sand Pack Interval: 55'-72' **Sand Pack Type:** 62'-79'
Completion Details: Completed with 2' Steel stick-up

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Recovery (ft)/ Blow Count	Lithology	Well Schematic
0	**1'-1.5'**			Vacuum Utility Clearance to 9' below ground surface (bgs). Hand auger to 1.5' BGS to collect soil sample on 4/1/05. Advance augers to 10' BGS and begin split spoons	
5					
10	10-12	0	2 5-7-7-12	Moist gray silt, slight clay content with some brown silt banding	
	12-14	0	2 12-17-15-21	Same as above	
	14-16	0	1.25 4-4-8-10	Same as above in top 6", changing to a brown sandy silt for 4" Changing to a gray & brown medium to fine sandy silt.	
15	16-18	0	1.25 26-16-23-30	Brown medium sand and gravel, pebble fragments. Dry	
	18-20	0	1.5 3-8-12-12	Moist gray silty clay in top 0.75' changing to a brownish orange fine to medium sand with some gravel.	
20	20-22	0	1.25 9-11-13-18	Brown fine sand and poorly sorted gravel with layers of coarse tan and gray sand, rock fragment in bottom of spoon	
	22-24	0	1 9-15-23-27	Same as above, more gravel and rock fragments present.	
	24-26	0	1.75 5-6-4-6	Brownish gray medium sand, wet. Some gravel in top 4"	
25	26-28	0	1.5 3-9-16-23	Wet brown fine sand and brown silt	
	28-30	0	1.25 10-22-32-26	Same as above, gravel and pebble fragments present	
30	30-32	0	1.25 20-23-25-31	Same as above. Weathered green serpentine rock fragments towards bottom of spoon	
	32-34	0	1.5 24-26-31-30	Wet brown fine sand with some gravel and pebble fragments	
	34-36	0	1.75 4-19-26-28	Moist to dry dark gray clayey silt. Wet gray medium sand in bottom of spoon.	
35	36-38	0	1.5 8-8-16-27	Wet gray medium sand	

Aquaterra Technologies, Inc.
Subsurface Log: S-119D (Continued)

Depth (ft)					Well Schematic
	38-40	0	2 1-1-2-2	Brown coarse sand in top 6" changing to a brownish gray moist to wet clay	
40	40-42	0	1 1-1-2-2	Same as above changing to a dark gray clayey silt, slightly moist.	
	42-44	0	0.75 2-2-2-2	Dark brown clayey silt, slightly moist.	
	44-46	0	1.5 4-6-7-7	Same as above	
45	46-48	0	1 4-4-5-5	Same as above	
	48-50	0	1.75 4-5-6-5	Same as above. Set 4" steel casing to 48' BGS. Grouted in place. Drilling continued on 4/7/05 Advance Mud rotary to 50' BGS and continue split spoons.	
50	50-52	0	2 6-7-9-12	Dark grayish brown clayey silt, slightly moist.	
	52-54	0	2 13-17-18-28	Same as above	
	54-56	0	2 5-7-10-13	Dark grayish brown silt changing to a dark grayish brown silt and fine sand in bottom 6" of spoon. Slightly moist	
55	56-58	0	1.5 13-19-24-18	Moist brown silty fine sand in top 4" of spoon changing to a wet gray and tan coarse sand with some small gravel.	
	58-60	0		Advance mud rotary to 65' BGS and collect spoon	
60	60-62				
65	65-67	0	2 24-10-10-15	Greenish gray silt and fine sand, slight moisture. 1" lense of light gray medium sand at 66' BGS. Advance to 70' BGS	
70	70-72	0	6" 52-50 / 0.2	White/light gray fine sand, wet and compact. End boring, set well at 72' BGS	

Note: Highlighted cell indicates soil sample submitted for laboratory analysis.

Aquaterra Technologies, Inc.
Subsurface Log: S-59D

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: S-59D **Log By:** M.B. Spancake **Date:** 3/24 & 4/12 & 13/05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: 2" **Length:** 15' **Slot Size:** 0.02 **Water Level (Init):** 42'
Casing Diameter: 2" **Length:** 41' **Type:** PVC
Drilling Method: Hollow Stem Auger/ Mud Rotary **Sample Method:** Split Spoon **Rig Type:** HSA/Mud rotary

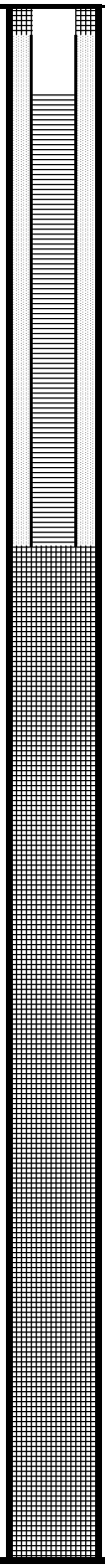
Construction Details

Total Well Depth: 56' BGS **Bentonite Interval:** 0'-39'
Screen Interval: 41'-56" **Cement/Grout Interval:**
Sand Pack Interval: 39'-56' **Sand Pack Type:** # 2
Completion Details: Completed with 2' Steel stick-up

= Backfill
= Cement/Grout
= Bentonite
= Sand

Depth (ft)	Sample Depth (ft)	OVM (ppm)	Recovery (ft) / Blowcount	Lithology	Well Schematic
0				Vacuum Utility Clearance to 9' below ground surface (bgs). Advance augers to 10' BGS and beging continuous split spoons.	
5					
10	10-12	0	1.75 4-5-5-7	Brown stiff clay becoming slightly sandy towards the bottom	
	12-14	0	2 7-7-9-12	Brown sandy clay, sand is coarse grained. Moist.	
	14-16	80	0.5 32-32-50 / 0.4	Wet brown sandy gravel.	
15					
	16-18		0 50 / 0.1	No recovery	
	18-20	100	1.25 7-9-18-8	Reddish gray coarse sandy gravel, wet.	
20	20-22	186	0.75 8-14-14-15	Same as above	
	22-24	92	1.5 48-24-20-20	Same as above. Rock fragment in shoe of spoon. Less moisture content towards bottom.	
	24-26	17	0.75 10-16-30-40	Wet fine sand and large rock fragments. Most of recovery is large rock fragments	
25					
	26-28	NA	2 23-27-28-31	Wet gray coarse sandy gravel. Bottom 3" changing to a gray clayey silt and fine sand.	
	28-30	214	2 4-5-5-6	Wet medium gray sand and small gravel	
30	30-32	0	2 3-3-4-5	Moist dark gray clayey silt and fine sand	
	32-34	44	2 5-7-8-13	Moist gray fine sandy clay, changing in color to a brownish gray in the bottom 2"	
	34-36	0	1 1-2-1-2	Grayish tan clayey silt, slightly moist	
35					
	36-38	0	1.25 3-4-4-5	Greenish gray stiff clayey silt with fine sand. Slightly moist.	

Aquaterra Technologies, Inc.
Subsurface Log: S-59D (Continued)

Depth (ft)					Well Schematic
	38-40	0	1 5-7-7-9	Same as above. Set 4" steel casing at 38' BGS on 3/24/05 and grouted in place. Continue with mud rotary on 4/12/05	
40	40-42	0	1 12-12-12-15	Brown fine sand, slightly moist to becoming wet at bottom.	
	42-44	0	1.5 14-12-12-16	Wet brown and gray fine sand Advance to 50' BGS and collect spoons every 5'.	
45					
50	50-52	NA	0 50/ 0.0	No recovery. Advance to 55' BGS.	
55	55-57	0	1.75 30-25-22-14	Coarse brown sand, large gravel and pebble present, wet.	
60	60-62			Borehole not staying open at this interval. Advance to 65' BGS.	
65	65-67	0	1 17-13-10-10	Gray and tan coarse sand and small poorly sorted gravel. Some large pebble fragments and a thin lense of reddish brown sandy silt at 61.5'	
70	70-72	0	1.25 11-11-12-15	Same as above.	
75	75-77	0	1 10-12-11-13	Coarse well sorted gravel, wet.	
80	80-82	0	1.5 22-14-24-21	Moist white saprolitic mica schist, dense and compact.	
85	85-87	0	1.25 17-19-14-15	Black and white saprolitic mica schist, dense and compact.	
90	90-92	0	1 21-16-17-19	Same as above. End boring and set well at 56' BGS. Backfilled anular space with bentonite chips.	

Aquaterra Technologies, Inc.
Subsurface Log: SS-S34-20'-22'-042105

Project Name: Sunoco Philadelphia Refinery AOI - 4 **Owner:** Sunoco, Inc. (R&M)
Location: Philadelphia, PA **Permit No.:**

Boring Number: SS-S34-20'-22'-042105 **Log By:** M.B. Spancake **Date:** 21-Apr-05
Casing Elevation: N/A **Driller:** Parrat Wolff **Borehole Dia:** 8.25'
Screen Diameter: NA **Length:** NA **Slot Size:** NA **Water Level (Init):** NA
Casing Diameter: NA **Length:** NA **Type:** NA
Drilling Method: Hollow Stem Auger **Sample Method:** 3" Spoon with brass liners **Rig Type:** HSA Rig

Construction Details

Total Boring Depth: 22' bgs **Backfill:** 0-22'
Screen Interval: NA **Cement/Grout Interval:**
Sand Pack Interval: NA **Bentonite Interval:** NA
Completion Details: NA **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 10' BGS Advance augers to 20' below ground surface and collect 3" diameter spoon with (4) 6" brass liners for SPP saturated soil sample Boring is located 25' south of S-34.	
5					
10	10-12				
15	15-17				
20	20-22			Drove spoon 2' and collected soil sample. Sample was collected in four 6" long brass liners and sealed and placed on dry ice. Samples were submitted to PTS GeoLabs for SPP mobility testing in soils.	

APPENDIX D

Soil and Groundwater Analytical Reports
(on CD)

APPENDIX E

Groundwater Sampling Field Summary Report – June 2013

Table E-1
Summary of June 2013 Groundwater Sampling Field Parameters
AOI-4
PES Facility
Philadelphia, Pennsylvania

Well Information					Pre-Purge					Post purge				
Location ID	Depth to Bottom (ft bgs)	Depth to Water (ft btic)[1]	Depth to Product (ft btic)	Product Thickness (ft)	COND	DO	ORP	PH	TEMP	COND	DO	ORP	PH	TEMP
					us/cm	mg/l	mV	su	deg c	us/cm	mg/l	mv	su	deg c
AS-9			–	–	–	–	–	–	–	–	–	–	–	–
MW-1	Destroyed		–	–										
MW-4	20	16.2	–	–	0.71	11.18	29.3	7.08	19.36	0.738	7.01	-15.1	6.62	16.25
RW-700	20	19.1	17.7	1.4	–	–	–	–	–	–	–	–	–	–
RW-701	20	18.06	18.04	0.02	–	–	–	–	–	–	–	–	–	–
RW-702	20	19.46	–	–	–	–	–	–	–	–	–	–	–	–
RW-703	20	22.82	–	–	–	–	–	–	–	–	–	–	–	–
RW-704	20	27.52	–	–	–	–	–	–	–	–	–	–	–	–
RW-705	20	15.77	–	–	–	–	–	–	–	–	–	–	–	–
RW-706	20	15.85	–	–	–	–	–	–	–	–	–	–	–	–
RW-707	42	16.16	–	–	765	0.49	-67	7.25	14.71	781	0.46	-60.9	7.02	14.7
RW-708	20	15.35	–	–	–	–	–	–	–	–	–	–	–	–
RW-709	20	15.75	–	–	–	–	–	–	–	–	–	–	–	–
RW-710	20	16.02	–	–	393	1.89	-86.7	6.92	15.19	393	1.71	-91.7	6.93	15.21
RW-711	20	18.19	–	–	–	–	–	–	–	–	–	–	–	–
RW-712	20	17.6	–	–	–	–	–	–	–	–	–	–	–	–
RW-713	20	16.31	–	–	–	–	–	–	–	–	–	–	–	–
RW-714	20	18.1	–	–	–	–	–	–	–	–	–	–	–	–
RW-715	20	17.66	–	–	–	–	–	–	–	–	–	–	–	–
RW-716	20	15.38	–	–	–	–	–	–	–	–	–	–	–	–
RW-717	–	15.39	–	–	–	–	–	–	–	–	–	–	–	–
S-26	26	20.56	–	–	0.143	3.15	-123.1	7.33	16.85	0.432	3.8	-94.8	6.8	15.58
S-27	Destroyed		–	–										
S-28	26	21.6	–	–	0.316	11.67	7.6	7.63	16.85	0.315	5.95	13.7	6.79	15.01
S-29	–	22.6	21.11	1.49										
S-30	–	27	22.36	4.64										
S-31	–	DRY	–	–	–	–	–	–	–	–	–	–	–	–
S-32	–	24.15	23.9	0.25	–	–	–	–	–	–	–	–	–	–
S-34	40	21.08	–	–	–	–	–	–	–	–	–	–	–	–
S-35	–	21.8	21.08	0.72	–	–	–	–	–	–	–	–	–	–
S-36	40	24.33	–	–	0.361	2.9	25.4	6.5	17.57	0.361	1.94	-14.1	6.37	17.66
S-38	26	18.8	–	–	0.123	11.11	64.8	7.48	16.45	0.142	6.89	72.6	7.04	15.14
S-39	34	22.57	–	–	0.56	14.03	93.9	7.03	15.15	0.845	10.02	114	6.17	14.95
S-40					0.174	4.63	47.8	8.06	16.17	0.176	7.59	29.2	7.56	15.71
S-56	27	14.8	–	–	–	–	–	–		–	–	–	–	–
S-57	15	12.43	–	–	0.674	6.31	26.3	6.88	17.44	0.67	4.59	-25	6.93	16.5
S-58	Not on Map	--	–	–	–	–	–	–	–	–	–	–	–	–
S-67	Not on Map	--	–	–	–	–	–	–	–	–	–	–	–	–
S-96	26	19.77	–	–	0.428	16.35	17.1	7.18	14.91	0.424	4.42	-8.2	6.69	14
S-97	33	27.87	–	–	0.353	5.33	60.2	6.4	17.51	0.352	3.9	57.4	6.41	17.35
S-102	24.5	18.28	–	–	219	0.15	-24.7	6.09	15.98	220	0.16	-18.7	5.9	16
S-103	–	26.1	25.9	0.2	–	–	–	–	–	–	–	–	–	–
S-104	–	19.1	17.63	1.47	–	–	–	–	–	–	–	–	–	–
S-119	37	26.58	–	–	0.197	25.17	15.4	8.17	16.36	0.192	8.28	21.8	7.64	15.44
S-120	33	19.52	–	–	0.121	20.42	30.4	7.64	15.52	0.117	11.32	79.8	7.06	13.93
S-121	30	20.8	–	–	0.116	36.18	54	7.28	15.07	0.112	18.49	82.4	6.76	13.91
S-122	36	25.44	–	–	0.246	13.32	65.7	7.45	10.6	0.237	9.71	73.5	6.98	14.83
S-123	–	26	25.96	0.04	–	–	–	–	–	–	–	–	–	–
S-124	–	23.8	22.89	0.91	–	–	–	–	–	–	–	–	–	–
S-216	27	15.5	–	–	377	0.19	-38.1	6.08	15.6	374	0.14	-34	5.96	15.55
S-218	35	25.35	–	–	0.497	18.44	33.2	6.57	14.9	0.521	5.57	11.3	6.64	14.7
S-219	29	22.88	–	–	0.154	23.25	14.8	7.95	16.6	0.149	12.76	19.3	7.64	14.16
S-220	–	22.25	21.4	0.85	–	–	–	–	–	–	–	–	–	–
S-221	–	23.25	22.51	0.74	–	–	–	–	–	–	–	–	–	–
S-222	28	15.57	–	–	0.206	3.92	59.9	6.78	16.23	0.2	2.8	72.7	6.26	15.66
S-223	31	15.61	–	–	0.194	9.28	67.3	7.04	17.35	0.189	2.28	17.7	6.55	13.74
S-224	33	15.8	–	–	0.302	26.09	-2.3	6.9	15.55	0.295	4.46	-29.5	6.65	15.47
S-225	30	16.5	–	–	1624	0.18	-87.1	6.45	14.24	1442	0.18	-87.4	6.4	14.08
S-229	Destroyed		–	–	–	–	–	–	–	–	–	–	–	–
S-233	–	22.25	20.97	1.28	–	–	–	–	–	–	–	–	–	–
S-234	30	21.36	–	–	405	0.28	-52	7.68	15.75	402	0.24	-56.8	7.47	15.56
S-235	–	23.81	22.69	1.12	–	–	–	–	–	–	–	–	–	–
S-236	–	24.15	22.61	1.54	–	–	–	–	–	–	–	–	–	–
S-237	–	24.2	22.4	1.8	–	–	–	–	–	–	–	–	–	–
S-238	–	22.96	22.71	0.25	–	–	–	–	–	–	–	–	–	–
S-239	27	15.65	–	–	0.106	10.17	-25.7	8.27	16.5	0.099	1.27	31.3	8.02	14.78
S-240	–	25.5	23.55	1.95	–	–	–	–	–	–	–	–	–	–
S-241	–	28.35	25.8	2.55	–	–	–	–	–	–	–	–	–	–
S-242	–	21.74	–	–	–	–	–	–	–	–	–	–	–	–
S-243	26	15.38	–	–	0.111	7.55	13.5	8.69	17.13	0.111	2.33	14.7	8.2	14.39
S-244	28	24.71	–	–	458	2.74	39.7	6.86	17.91	385	2.25	45.3	6.81	18.11
S-245	34	21.94	–	–	0.555	5.05	-138.7	7.45	16.36	0.533	1.35	-144.2	6.98	14.92
S-246	35	20.8	–	–	371	0.4	-97.7	8.38	14.78	375	0.31	-91.6	8.18	14.38
S-278	–	21.61	20.65	0.96	–	–	–	–	–	–	–	–	–	–
S-279	–	26	25.95	0.05	–	–	–	–	–	–	–	–	–	–
S-282	–	22.8	21.85	0.95	–	–	–	–	–	–	–	–	–	–
S-329	44	22.95	–	–	620	1.28	100.8	11.28	15.9	558	1.13	-122.8	11.38	15.78
*S-364	33	21.67	–	–	886	0.33	-80.4	6.11	15.45	886	0.35	-82.2	6.06	15.38
*S-365	30	21.05	20.95	0.1	–	–	–	–	–	–	–	–	–	–
*S-366	36	22.45	–	–	821	0.24	-53.3	6.64	15.98	777	0.28	-50.3	6.53	15.83
*S-367	33	16.05	–	–	1003	0.18	-23.6	6.38	15.39	998	0.17	-19.6	6.23	15.3
*S-368	33	17.61	–	–	684	0.14	-72.9	6.35	15.7	683	0.11	-71.4	6.27	15.62
*S-369	–	30.09	30.06	0.03	–	–	–	–	–	–	–	–	–	–
*S-370	30	12.31	–	–	NR	22.79	-4.7	7.65	16.5	0.138	2.07	3	7.21	17.28
*S-371	36	20.57	–	–	0.372	89.59	70.5	6.86	15.55	0.358	5.16	34.8	6.69	14.71
*S-372	33	19.55	–	–	0.57	9.97	11.4	7.05	15.5	0.573	5.33	-17.5	6.84	14.78
*S-373	25	21.67	21.3	0.37	–	–	–	–	–	–	–	–	–	–
*S-379	32	25.9	–	–	0.306	6.64	46.7	6.74	16.5	0.36	4.15	28.4	6.71	15.87
*S-380	32	21.25	–	–	0.584	9.67	32	7.67	16.4	0.495	3.31	12	7.3	16.12
*S-381	36	25.9	–	–	0.35	20.06	56.1	6.93	15.4	0.368	2.65	14.5	6.52	14.9

Notes:
1. Measured prior to purging
Groundwater quality readings collected using a YSI
A minimum of 3 well volumes were purged at each well location, unless well went dry during purging
All wells were sampled using poly bailers
ft btic - Feet below top of inner casing
ft bgs - Feet below ground surface
mg/L - Milligrams per Liter
deg c - Degrees celsius
mV - Milli volts
uS/cm - Micro siemens per centimeter
su - Standard units
NM - Not measured
NP - No measurable (>0.01 ft) product
NS-P - Not sampled due to measurable (>0.01 ft) product

Table E-2
Summary of 2005 Groundwater Sampling Field Parameters
AOI-4
PES Facility
Philadelphia, Pennsylvania

WELL IDENTIFICATION	SAMPLE DATE	DEPTH TO WATER (feet)	DEPTH TO BOTTOM (feet)	WATER COLUMN (feet)	CONVERSION FACTOR	GALLONS IN WELL	PURGE VOLUME (Gallons)
MW1	6-May-05	15.08	20	4.92	0.04	0.2	0.6
MW4	6-May-05	6.10	16	9.9	0.04	0.4	1.2
S102	6-May-05	17.67	20	2.33	0.65	1.5	4.5
S119	3-May-05	25.85	37	11.15	0.65	7.2	21.7
S120	3-May-05	18.07	30	11.93	0.65	7.8	23.3
S121	4-May-05	20.28	30	9.72	0.65	6.3	19.0
S122	3-May-05	23.88	34.6	10.72	0.65	7.0	20.9
S123	4-May-05	20.48	30	9.52	0.65	6.2	18.6
S26	2-May-05	18.92	24	5.08	0.16	0.8	2.4
S27	2-May-05	23.01	34.75	11.74	0.16	1.9	5.6
S28	4-May-05	22.67	25	2.33	0.16	0.4	1.1 (Purged 0.75 gallons, went dry)
S31	2-May-05	16.12	25	8.88	0.16	1.4	4.3 (Purged 2 gallons, went dry)
S38	3-May-05	17.30	23.2	5.9	0.16	0.9	2.8
S38D	3-May-05	18.15	130	111.85	0.16	17.9	53.7
S38I	3-May-05	18.68	80	61.32	0.16	9.8	29.4
S39	3-May-05	21.06	34	12.94	0.37	4.8	14.4
S40	3-May-05	22.27	28	5.73	0.16	0.9	2.8
S96	1-Aug-05	19.51	23	3.49	0.16	0.6	1.7 (Purged 0.5 gallons, went dry)
S97	4-May-05	27.98	35	7.02	0.65	4.6	13.7
S216	28-Apr-05	14.56	29	14.44	0.65	9.4	28.2
S218	28-Apr-05	24.09	33	8.91	0.65	5.8	17.4
S219	28-Apr-05	24.09	30	5.91	0.65	3.8	11.5
S222	1-Aug-05	16.79	28	11.21	0.65	7.3	21.9
S223	1-Aug-05	15.62	30	14.38	0.65	9.3	28.0
S224	1-Aug-05	15.80	32	16.2	0.65	10.5	31.6
S225	28-Apr-05	15.27	30	14.73	0.65	9.6	28.7
S229	28-Apr-05	22.70	33	10.3	0.65	6.7	20.1
S-119D	3-May-05	14.26	74	59.74	0.16	9.6	28.7
S59D	6-May-05	16.54	58	41.46	0.16	6.6	19.9

APPENDIX F

LNAPL Modeling Procedures and Results – September 2013

APPENDIX F
LNAPL SAMPLING ANALYTICAL DATA AND MODELING PROCEDURES
AOI 4: PHILADELPHIA ENERGY SOLUTIONS FACILITY
PHILADELPHIA, PENNSYLVANIA

F.1 INTRODUCTION AND OVERVIEW

Models which assess volume, mobility, and recoverability of light non-aqueous phase liquid (LNAPL) contamination have progressed beyond simply extrapolating LNAPL monitoring well thicknesses into the surrounding geologic materials. Instead, these models incorporate the physical properties of groundwater, LNAPL, and soil, in conjunction with an improved understanding of how fluids interact with each other and the surrounding geologic materials, and provide better estimates of LNAPL volume, mobility, and recoverability. These scientific improvements have allowed more realistic endpoints to be set during the remediation process.

For the LNAPL modeling in AOI 4 at the Philadelphia Energy Solutions (PES) Facility in Philadelphia, PA (the Facility), Langan utilized the American Petroleum Institute (API) Publication Number 4682, "Free-Product Recovery of Petroleum Hydrocarbon Liquids," dated June 1999, as a guide for assessing LNAPL volume, mobility, and recoverability. The parameters discussed in subsequent sections are presented in API Publication 4682 as the significant variables and parameters needed to evaluate the nature and extent of free LNAPL. An updated version of the API model found in the API publication "API Interactive LNAPL Guide," version 2.0.4, dated July 2004, was used. These parameters and the API model were utilized to estimate the specific volume and mobility of LNAPL at the Facility.

F.2 LNAPL CHARACTERIZATION RESULTS

Characterization was performed on a total of 16 LNAPL samples from AOI 4. Six samples were characterized in April 2005, eight in March 2004 and two additional samples were characterized in June 2013 from well S-365 and S-369 in AOI 4. The characterization analyses were performed by Torkelson Geochemistry of Tulsa, OK. The characterization results for all sixteen samples are summarized in Table F.1. Chromatographic LNAPL finger printing results indicate four different LNAPL/mixtures present in AOI 4. The LNAPL types include middle distillate, coker naphtha/middle distillate mixture, gasoline/middle distillate mixture, and middle distillate/alkylate mixture. The LNAPL chromatograms can be found at the end of this Appendix.

F.3 LNAPL MODELING

LNAPL modeling was previously completed in both the Current Conditions Report and 2005 AOI 4 Site Characterization Report. Results from previous modeling indicated areas of potential LNAPL mobility in the center and western side of AOI 4, however, they are considered to have low to no risk for offsite migration because they are located several hundred or more feet from the PES Facility boundary. Locations modeled either for the Current Conditions Report or 2005 AOI 4 Site Characterization Report were not re-evaluated as part of the current modeling effort. Based on LNAPL fingerprinting or fingerprinting results of nearby wells, the primary LNAPL type in the fifteen wells currently being evaluated is a coker naphtha/middle distillate mixture.

LNAPL thicknesses in wells gauged prior to 2013 have generally remained constant or decreased. In June 2013 fourteen new wells in AOI 4 had measureable amounts of LNAPL. LNAPL thicknesses in these fourteen wells ranged 0.02 feet at RW-701 to 2.55 feet at S-241. For the AOI 4 SCR/RIR update, LNAPL modeling was performed for these fifteen wells which were installed after the 2005 AOI 4 Site Characterization Report. One additional well, S-123 previously did not contain LNAPL in 2005; however, contained LNAPL in 2013.

F.3 ANALYTICAL PROGRAM AND LNAPL MODELING PROCEDURE

In 2005, groundwater and LNAPL samples from S-34 and S-198 (AOI 1) were collected for physical properties analysis including:

- Interfacial/surface tension,
- Viscosity,
- Specific gravity, and
- Density.

The physical properties of LNAPL and groundwater were entered into the API model as summarized in Table F.2. Any location with LNAPL that has not been analyzed for fluid properties has been assigned values from the API database based upon LNAPL type present or by proximity to other locations with LNAPL data. The site-specific data, when compared to API database values, were found to be conservative in representing site conditions. The API model was then used to calculate the specific volume of LNAPL in the formation surrounding each well. These values are summarized in Table F.3

The API model also calculates relative permeability of LNAPL. Using site-specific viscosity values or surrogate values from the API or Environment Canada databases, the seepage velocity of LNAPL was then calculated. The seepage value calculations are summarized in Table F.4. The seepage velocity at which LNAPL flows is a strong indication of the mobility and recoverability of LNAPL from the subsurface.

F.4 API LNAPL MODEL INPUT PARAMETERS

Site specific and representative values obtained from the API's LNAPL and Environmental Canada's Reference Database were used to identify input parameters. Table F.2 of this appendix summarizes the LNAPL modeling input parameters used for this phase of the project. The individual input parameters used for the LNAPL models are described in detail below.

F.5 FLUID PROPERTIES

The fluids of concern in LNAPL modeling are LNAPL, groundwater, and air. Key physical properties of these fluids are density (ρ), interfacial tension (σ) and viscosity (μ). Chromatographic and mass spectroscopic hydrocarbon LNAPL characterization analyses were conducted on collected LNAPL samples in an attempt to identify and categorize LNAPLs on site.

F.5.1 Fluid Density and Specific Gravity

Fluid density,ρ, is the mass of fluid per unit volume. Specific gravity, ρ_r, is the relative density of LNAPL with respect to the density of water. The density of LNAPL is related to its specific gravity through the following relationship:

$$\rho_r = \rho_o/\rho_w \qquad \text{(F.1)}$$

where ρ_o and ρ_w are the LNAPL and water densities, respectively.

Density estimates for LNAPL samples collected from wells within the Facility were determined from LNAPL and groundwater density data. If a density value was not

available for the LNAPL in a particular monitoring well, a value was assigned based on the physical characteristics of the LNAPL observed in neighboring wells.

F.5.2 LNAPL Viscosity

Viscosity is the measure of friction between molecules within a given fluid. The dynamic (or absolute) viscosity, μ, is defined as the ratio of the shear stress to the strain rate for a Newtonian fluid (Newtonian fluids have constant viscosity and flow immediately on the application of a force). The kinematic viscosity (ν) is the ratio of the dynamic viscosity to the density of a fluid.

If a kinematic viscosity value was not available for the LNAPL within a monitoring well, a value was assigned based on the physical characteristics of the LNAPL in relation to neighboring monitor wells, or a representative viscocity value was selected from the API or Environmental Canada Database chosen based upon other LNAPL physical characteristics.

F.6 FORMATION PHYSICAL PROPERTIES

Where available, site-specific geologic and hydrogeologic data were obtained from site soil boring investigations, monitoring and recovery wells installation and sampling activities, and aquifer characteristic testing. All remaining physical property input values were obtained from reference literature.

Variations in soil type were noted from boring log descriptions. For the purpose of determining modeling parameters, generalizations of the geologic characteristics were made based on the occurrence and distribution of soil types within the LNAPL wetted screen interval of monitoring wells. Consistent with the API guidance publication, the geologic parameters of interest include: soil texture, porosity, bulk density, fluid saturation, capillary pressure relationships, and total organic carbon (TOC). These parameters are discussed in detail below.

F.6.1 Formation Texture

One of the most important parameters in determining the properties of porous media is the size range of particles in a soil, which is referred to as soil texture. Grain size is

closely related to soil texture, and a grain size distribution gives the relative percentage of grain sizes within a formation.

Where available, historic site-specific grain size distribution data were used to describe the relative percentage of grain size within the various geologic units at the Facility. Regions with similar grain size distributions were grouped together, and representative values were selected. Soil within the historic maximum LNAPL wetted interval was used for this selection. Note, however, that in any given boring log, the soil type spanning the LNAPL wetted interval may actually include a range of soil types. In addition to the grain size analyses, the soil Atterberg Limits were referenced for select soil types. The Atterberg limits were used to correlate and characterize the fine-grained soil (i.e., silt and clay) in conjunction with the grain size distribution analyses.

F.6.2 Porosity

The ratio of the volume of void space in a soil to the total volume is defined as the porosity (n), which is usually written as a fraction or a percent of void space. Generally, wider variations in particle sizes result in smaller porosity values, as the void space between the larger particles are filled by smaller particles. The effective porosity (or kinematic porosity) refers to the volume of interconnected pore spaces through which fluids can flow.

F.6.3 Bulk Density

Bulk density is a measure of the weight of the soil per unit volume, usually given on an oven-dry (110° C) basis. Variation in bulk density is attributable to the relative proportion and specific gravity of solid organic and inorganic particles and to the porosity of the soil. Most mineral soils have bulk densities between 1.0 and 2.0.

F.6.4 Fluid Saturation

According to the API guidance documents, the void space of a natural porous medium affected by an LNAPL release is filled with water, air and LNAPL. The fraction of the pore space of a representative volume of material that is occupied by a particular fluid is

called the fluid saturation. The fluid saturation of each phase can range from 0 to 1, and the sum of the three phases must equal 1.

F.6.5 Capillary Pressure Relationships

According to the API guidance document, molecules located near the interface between two fluids (i.e. water and LNAPL) in one void space have a greater energy than molecules of the same fluid located within the bulk volume due to cohesive forces between the molecules. The excess energy associated with a fluid interface results in interfacial tension between the fluids, and surface tension between the liquid and vapor.

These relationships are incorporated into the API model for determining formation specific volume under vertical equilibrium.

F.7 LNAPL EFFECTIVE PERMEABILITY

Water, air, and LNAPL are in competition for the interstitial spaces within the formation. Relative permeability describes the ability of one fluid to flow in the presence of other fluids, compared to the ability of the fluid to flow if it were the only fluid present. Typically, these differences in permeability between water and LNAPL are observed as LNAPL reaches the water table in sufficient quantities, pools, and spreads laterally as a floating layer.

The API modeling approach is to predict the LNAPL saturation and relative permeability distributions under vertical equilibrium conditions. The effective saturation and relative permeability values depend on the LNAPL thicknesses within the formation, for which the apparent monitoring well LNAPL thicknesses serve as a useful measure. The modeling objective is to replace the layer with varying saturation and relative permeability with an equivalent layer with vertically uniform characteristics.

The API model was run to determine the effective relative permeability of LNAPL within the modeled wells. As a first approximation, the residual saturation of LNAPL (the portion of LNAPL that is adhered to soil and not recoverable) was considered to be zero for the calculation of effective relative permeability. The residual saturation of LNAPL will be determined based on the soil grain size, fluid saturation and capillary curves for the recoverability analysis.

F.8 SOIL INTRINSIC PERMEABILITY

The intrinsic permeability of the soil was estimated using the following equation:

$$k_{soil} = \frac{K_W \mu_W}{\rho_W g} \quad \text{(F.2)}$$

where,

k_{soil} = permeability of soil

K_w = hydraulic conductivity of groundwater for fill horizon

μ_w = dynamic viscosity of water

p_w = density of water

g = gravity

The estimates of the ground water density and viscosity were used to determine the intrinsic soil permeability. The gravity constant was assumed to be 32.2 feet/s^2 (9.81 m/s^2).

F.9 LNAPL HYDRAULIC CONDUCTIVITY AT SATURATION

To estimate the seepage velocity of the free-phase LNAPL, the hydraulic conductivity of the formation with respect to LNAPL must be known. The hydraulic conductivity of LNAPL is first calculated at 100% saturation at the LNAPL phase. Then it is corrected from the effective LNAPL relative permeability. This corrected hydraulic conductivity of LNAPL is the hydraulic conductivity of LNAPL in the formation at the estimated saturation of LNAPL. This can be estimated based on the following equation:

$$K_{oil} = k_{ro} \frac{k_{soil} \rho_{oil} g}{\mu_{oil}} \quad \text{(F.3)}$$

where,

K_{oil} = hydraulic conductivity of LNAPL in the soil at saturation

k_{ro} = effective LNAPL relative permeability

k_{soil} = permeability of soil relative to groundwater (Equation F.2)

μ_{oil} = dynamic viscosity of LNAPL

p_{oil} = density of LNAPL

g = gravity

F.10 LNAPL SPECIFIC DISCHARGE

The result of the corrected hydraulic conductivity for LNAPL saturation (Equation F.3) was used to calculate the specific velocity of the LNAPL based on hydraulic gradient of the groundwater using the following equation:

$$q_{oil} = K_{oil} \times i_W \tag{F.4}$$

where,

q_{oil} = LNAPL specific velocity of LNAPL discharge

K_{oil} = hydraulic conductivity of LNAPL in the soil at the corrected saturation

i_w = water table gradient

The water table gradient was assumed to be similar to the LNAPL table gradient. Based on the groundwater monitoring data collected to date, average water table gradients were selected.

The seepage velocity or mobility of the LNAPL was calculated based on the specific velocity calculated in Equation F.4, and correcting it for the effective porosity of the formation as follows:

$$v_{oil} = \frac{q_{oil}}{\phi_{eff}} \tag{F.5}$$

where,

v_{oil} = LNAPL seepage velocity

q_{oil} = LNAPL specific velocity of LNAPL discharge

ϕ_{eff} = effective porosity

The specific velocity of the LNAPL discharge from the previous calculation was divided by the effective porosity to determine the seepage velocity of LNAPL for all wells. For this calculation, total porosity values associated with each soil type were reduced for use as an effective porosity for LNAPL mobility.

Located in Tables F.3 and F.4 are the output results of the LNAPL modeling. Located in Table F.1 of this appendix is the LNAPL characterization data provided by Torkelson Laboratories.

F.9 LNAPL MODELING RESULTS

API LNAPL volume and mobility modeling was performed for 14 new wells and one existing well which had newly identified measureable LNAPL within AOI 4 of PES Facility in June 2013.

Results of the LNAPL specific volume calculations (Table F.4) indicated that LNAPL specific volumes ranged from 2.25×10^{-6} feet (RW-701) to 0.908 feet (S-241). Of the 15 monitoring well locations modeled, no locations have specific volumes greater than 1 foot; 9 locations have specific volumes greater than 0.1 foot; 10 locations have specific volumes greater than 0.01 foot; and 5 locations have specific volumes less than 0.01 foot. Calculated LNAPL relative permeability ranges from 6.68×10^{-7} to 0.828 (unitless).

Results of the seepage velocity calculations (Table F.4) indicate that seepage velocities ranged from 87.6 meters per year (S-278) to 7.6×10^{-7} meters per year (MW-369). Of the 15 locations with measureable LNAPL, four locations have seepage velocities greater than 10 meters per year; five locations have seepage velocities greater than one meter per year; five have seepage velocities between 1×10^{-1} to 1×10^{-6} meters per year; and one has a seepage velocity less than 1×10^{-7} meters per year.

Eleven wells (S-365, RW-700, S-237, S-238, S-236, S-240, S-282, S-241, S-235, S-233 and S-278) have calculated LNAPL seepage velocities greater than 0.1 meter per year. 9 of the 11 wells (all except S-282 and S-365) are located in the vicinity of the Penrose Avenue Recovery System. The high seepage velocities calculated for these wells is a function of the increased hydraulic gradients caused by the pumping of the system. LNAPL mobility in these wells does not pose a risk for offsite migration because the Penrose Recovery System is actively capturing the LNAPL in this area. S-282 and S-365 are located along the western border of AOI 4 where hydraulic gradients indicate potential LNAPL migration from these wells would occur in the direction of AOI 3.

An apparent LNAPL thickness of 0.03 feet was measured in S-369, which is located approximately 35 feet from the eastern boundary of the PES facility. The LNAPL thickness is very limited and the seepage velocity calculations indicate the LNAPL is essentially immobile (7.6×10^{-7} meters per year). However, the extent of the LNAPL plume around S-369 is not delineated and possibly extends off the PES facility boundary. Delineation of the LNAPL in the vicinity of S-369 will be addressed in the Cleanup Plan.

Table F.1
LNAPL Characterization Summary Table
AOI-4
PES Faciltiy
Philadelphia, Pennsylvania

Interpretation of Product Types, Proportions, and Weathering							
Characterization Results Compiled for CCR (TGI Job No. 04046 - Analyzed in March 2004)							
Well ID	**Density g/cc (60°F)**	**LNAPL Type(s)**	**Torkelson LNAPL Type(s)**	**Proportion (%)**	**Weathering**	**Fairly Similar To**	**Somewhat Similar To**
S-103	0.7978	Gasoline Middle Distillate	Avation Gasoline Middle Distillate	70 30	Extreme Extreme		
S-104	0.8787	Middle Distillate	Middle Distillate	100	Extreme		
S-124	0.8223	Light End Feed Stock Middle Distillate	Coker Naphtha Middle Distillate	40 60	High Moderate		
S-29	0.8550	Middle Distillate	Middle Distillate	100	High		
S-32	0.8665	Middle Distillate	Middle Distillate	100	Severely		
S-33	0.8578	Gasoline Middle Distillate	Gasoline Middle Distillate	5 95	Extreme Extreme		
S-56	0.8684	Gasoline Middle Distillate	Gasoline Middle Distillate	2 98	Extreme Extreme		
S-97	0.8653	Middle Distillate	Middle Distillate	100	Severely		
Characterization Results Compiled for AOI 4 Site Characterization 2005 **Interpretation of Product Type(s), Proportions and Weathering**							
Well ID	**Density (gm/ml @ 60°F)**	**LNAPL Type(s)**	**Torkleson LNAPL Type(s)**	**Proportions (%)**	**Weathering**	**Fairly Similar To**	**Somewhat Similar To**
S-35	0.8665	Middle Distillate	Middle Distillate	100	Extreme		
S-37	0.8639	Gasoline Middle Distillate	Gasoline Middle Distillate	2 98	Unknown High		
S-57	0.8620	Middle Distillate	Middle Distillate	100	Extreme		
S-217	QNS	Gasoline and Light End Feed Middle Distillate	Gasoline and Heavy Virgin Naptha Middle Distillate	61 39	Slight Slight		
S-220	QNS	Gasoline and Light End Feed Middle Distillate	Gasoline and Heavy Virgin Naptha Middle Distillate	70 30	Moderate High		
S-221	QNS	Gasoline and Light End Feed Middle Distillate	Gasoline and Heavy Virgin Naptha Middle Distillate	67 33	Slight Slight		

Characterization Results Compiled for AOI 4 Repackaged Site Characterization Remedial Investigations Report **Interpretation of Product Type(s), Proportions and Weathering**							
Well ID	**Density (gm/ml @ 60°F)**	**LNAPL Type(s)**	**Torkleson LNAPL Type(s)**	**Proportions (%)**	**Weathering**	**Fairly Similar To**	**Somewhat Similar To**
S-365	0.8158	Gasoline	Unknown Light Material	48	Unknown		
		Middle Distillate	Middle Distillate	52	Extreme	S-369	S-382
S-369	QNS	Middle Distillate	Middle Distillate	80	Extreme	S-365	S-382
		Alkylate	Alkylate	20	Unknown		S-360 and S-363

Notes:
1. Characterization Data Provided by Torkelson Geochemistry of Tulsa, OK
2. QNS = Quantity Not Sufficient for Density Determination
3. Characterization Data from wells S-365 and S-369 collected June 2013

Table F.2
API Model Input Parameters
AOI 4 Repackaged SCR/RIR
PES Facility
Philadelphia, Pennsylvania

Well ID	Apparent LNAPL Thickness Field Measurement[1]		API Database							LNAPL Density (Torkelson Geochemistry) (gm/cc)	LNAPL Type or Source of Surrogate LNAPL Type (Torkelson Geochemistry)	API/Environment Canada Database or PTS Data		
			Porosity Well ID (unitless)	USCS Soil Type Surrounding Well Screen[2]	Source of Soil Type	van Genuchten "N" (unitless)	van Genuchten "a" [m^{-1}]	van Genuchten "a" [ft^{-1}]	Irreducible Water Saturation[3] (unitless)			Air/Water Surface Tension[4] (dynes/cm)	Air/LNAPL Surface Tension (dynes/cm)	LNAPL/Water Surface Tension (dynes/cm)
	meter	feet												
RW-700	0.43	1.40	0.415	s(ML)	S-237	1.82	0.955	3.133	0.498	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
RW-701	0.01	0.02	0.415	s(ML)	S-237	1.82	0.955	3.133	0.498	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-123	0.01	0.04	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8653	Middle Distillate	57.7	28.6	16.6
S-233	0.39	1.28	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-235	0.34	1.12	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-236	0.47	1.54	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-237	0.55	1.80	0.415	s(ML)	Boring Log	1.82	0.955	3.133	0.498	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-238	0.08	0.25	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-240	0.59	1.95	0.404	SP-SM	Boring Log	2.39	2.490	8.169	0.150	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-241	0.78	2.55	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-278	0.29	0.96	0.443	SW	S-234	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-279	0.02	0.05	0.443	SW	S-241	3.26	2.870	9.416	0.114	0.8223	Coker Naphtha/Middle Distillate Mixture	65.000	26.900	22.300
S-282	0.29	0.95	0.443	SW	S-365	3.26	2.870	9.416	0.114	0.8158	Unknown Light Material/Middle Distillate	65.7	23.3	14.4
S-365	0.03	0.10	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8158	Unknown Light Material/Middle Distillate	65.7	23.3	14.4
S-369	0.01	0.03	0.443	SW	Boring Log	3.26	2.870	9.416	0.114	0.8787	Middle Distillate	57.7	28.6	16.6

Notes:

1. Density values were determined from LNAPL samples taken by Aquaterra in June 2013 and February 2004, or from samples collected by SECOR in 1999-2000.
2. For wells with no direct density measurements, the density value in the nearest well with a direct density was used.
3. Depth to Water and Depth to LNAPL provided by Aquaterra June 2013.
4. Determined from soil boring log. If a soil boring log was not available, the soil type in the nearest well with a soil boring log was used.
5. Determined by Torkelson Geochemistry. If a well with LNAPL present that was not fingerprinted, the LNAPL type in the nearest monitoring well that has been fingerprinted was used.

API = American Petroleum Institute
AOI = Area of Interest
USCS = Unified Soil Classification System
g/ml = grams per milliliter
LNAPL = Light Non-Aqueous Phase Liquid
amsl = above mean sea level

USCS Soil Descriptions (API Database)
s(ML) = sandy SILT
SW = well-graded SAND fine to coarse SAND
SP-SM = silty SAND, poorly graded

Interfacial/Surface Tension Data Source	Reference
Aviation Gasoline/Middle Distillate Mixture	American Petroleum Institute LNAPL Parameters Database, 2003
Coker Naphtha/Middile Distillate Mixture	Coker naphtha/middle distillate mixture from Environment Canada Database
Gasoline/Middle Distillate Mixture	Gasoline/middle distiallate mixture from S-198 (PTS Geolab Data, 2005)
Middle Distillate	Middle distillate from S-34 (PTS Geolab Data, 2005)
Unknown Light Material/Middle Distillate	Gasoline/middle distiallate mixture from S-198 (PTS Geolab Data, 2005)

Table F.3
API Model Output
AOI 4 Repackaged SCR/RIR
PES Facility
Philadelphia, Pennsylvania

Well ID	Apparent LNAPL Thickness Field Measurement[1]		API Model Results		
			Specific Volume	Specific Volume	Relative Permeabilty
	meter	feet	feet	meters	unitless
RW-700	0.43	1.40	1.06E-01	3.22E-02	2.32E-01
RW-701	0.01	0.02	2.25E-06	6.85E-07	2.84E-05
S-123	0.01	0.04	2.46E-05	7.49E-06	8.75E-06
S-233	0.39	1.28	4.12E-01	1.26E-01	7.20E-01
S-235	0.34	1.12	3.50E-01	1.07E-01	6.91E-01
S-236	0.47	1.54	5.13E-01	1.56E-01	7.56E-01
S-237	0.55	1.80	1.60E-01	4.89E-02	2.86E-01
S-238	0.08	0.25	2.88E-02	8.77E-03	1.42E-01
S-240	0.59	1.95	5.32E-01	1.62E-01	7.02E-01
S-241	0.78	2.55	9.08E-01	2.77E-01	8.28E-01
S-278	0.29	0.96	2.88E-01	8.77E-02	6.52E-01
S-279	0.02	0.05	8.48E-05	2.58E-05	6.05E-05
S-282	0.29	0.95	3.24E-01	9.89E-02	7.65E-01
S-365	0.03	0.10	7.18E-03	2.19E-03	4.88E-02
S-369	0.01	0.03	4.51E-06	1.37E-06	6.68E-07

NOTES:
(1) Groundwater/LNAPL guaging event June 2013.

Table F.4
Seepage Velocity Calculations
AOI 4 Repackaged SCR/RIR
PES Facility
Philadelphia, Pennsylvania

Well ID	API Database USCS Soil Type Equivalent	LNAPL Density	Dominant LNAPL Type at Each Well Location	API Model Calculated LNAPL Relative Permeabilty	Effective Porosity	Groundwater Density @ 60F (kg/m^3)	Groundwater Dynamic Viscosity ($N{\cdot}s/m^2$)	Soil Permeabililty (m^2)	K_{ro} (%)	Groundwater Gradient	Dynamic Viscosity of LNAPL (N·s/m2)	LNAPL Density (kg/m3)	LNAPL K @ 100% Saturation (m/day)	Corrected LNAPL K (m/day)	LNAPL Specific Discharge (m/day)	LNAPL Seepage Velocity (m/year)	LNAPL Seepage Velocity (cm/sec)
		(gm/cc)		Unitless	API Database	CRC	API Database	API Database	API Model	December 2012 AOI-6 Contour Map	API/Env. Canada Databases of PTS Data[(1)]	Torkelson Geochemistry Inc.	Calculated	Calculated	Calculated	Calculated	Calculated
RW-700	s(ML)	0.8223	Coker Naphtha/Middle Distillate Mixture	2.32E-01	0.415	999.19	1.124E-03	5.12E-13	23.21%	0.003	8.223E-04	822.30	4.34E-01	1.01E-01	3.47E-04	3.05E-01	9.62E-07
RW-701	s(ML)	0.8223	Coker Naphtha/Middle Distillate Mixture	2.84E-05	0.415	999.19	1.124E-03	5.12E-13	0.00%	0.001	8.223E-04	822.30	4.34E-01	1.23E-05	9.77E-09	8.59E-06	2.71E-11
S-123	SW	0.8653	Middle Distillate	8.75E-06	0.443	999.19	1.124E-03	6.02E-12	0.00%	0.008	3.877E-03	865.30	1.14E+00	9.96E-06	8.09E-08	6.67E-05	2.10E-10
S-233	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	7.20E-01	0.443	999.19	1.124E-03	6.02E-12	72.05%	0.028	8.223E-04	822.30	5.10E+00	3.68E+00	1.03E-01	8.47E+01	2.67E-04
S-235	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	6.91E-01	0.443	999.19	1.124E-03	6.02E-12	69.06%	0.007	8.223E-04	822.30	5.10E+00	3.52E+00	2.48E-02	2.04E+01	6.44E-05
S-236	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	7.56E-01	0.443	999.19	1.124E-03	6.02E-12	75.64%	0.001	8.223E-04	822.30	5.10E+00	3.86E+00	3.05E-03	2.51E+00	7.92E-06
S-237	s(ML)	0.8223	Coker Naphtha/Middle Distillate Mixture	2.86E-01	0.415	999.19	1.124E-03	5.12E-13	28.56%	0.011	8.223E-04	822.30	4.34E-01	1.24E-01	1.34E-03	1.18E+00	3.72E-06
S-238	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	1.42E-01	0.443	999.19	1.124E-03	6.02E-12	14.17%	0.002	8.223E-04	822.30	5.10E+00	7.23E-01	1.55E-03	1.28E+00	4.03E-06
S-240	SP-SM	0.8223	Coker Naphtha/Middle Distillate Mixture	7.02E-01	0.404	999.19	1.124E-03	4.16E-12	70.24%	0.002	8.223E-04	822.30	3.53E+00	2.48E+00	4.88E-03	4.41E+00	1.39E-05
S-241	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	8.28E-01	0.443	999.19	1.124E-03	6.02E-12	82.83%	0.004	8.223E-04	822.30	5.10E+00	4.23E+00	1.66E-02	1.37E+01	4.31E-05
S-278	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	6.52E-01	0.443	999.19	1.124E-03	6.02E-12	65.16%	0.032	8.223E-04	822.30	5.10E+00	3.32E+00	1.06E-01	8.76E+01	2.76E-04
S-279	SW	0.8223	Coker Naphtha/Middle Distillate Mixture	6.05E-05	0.443	999.19	1.124E-03	6.02E-12	0.01%	0.004	8.223E-04	822.30	5.10E+00	3.09E-04	1.21E-06	9.99E-04	3.15E-09
S-282	SW	0.8158	Unknown Light Material/Middle Distillate	7.65E-01	0.443	999.19	1.124E-03	6.02E-12	76.48%	0.003	8.566E-04	815.80	4.86E+00	3.72E+00	1.01E-02	8.31E+00	2.62E-05
S-365	SW	0.8158	Unknown Light Material/Middle Distillate	4.88E-02	0.443	999.19	1.124E-03	6.02E-12	4.88%	0.001	8.566E-04	815.80	4.86E+00	2.37E-01	1.42E-04	1.17E-01	3.70E-07
S-369	SW	0.8787	Middle Distillate	6.68E-07	0.443	999.19	1.124E-03	6.02E-12	0.00%	0.001	3.937E-03	878.70	1.14E+00	7.61E-07	9.17E-10	7.55E-07	2.38E-12

NOTES:

(1) arithmetic average of all values reported by PTS from Shelby-tube sample analysis.

gm/cc = grams per cubic centimeter

kg/m^3 = kilogram per cubic meter

$N{\cdot}s/m^2$ = Newton-seconds per square meter

m^2 = square meter

K_{ro} = LNAPL relative permeability

Figure F.1a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-700
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.400

Soil Characteristic		
n =	0.415	porosity
N =	1.820	van Genuchten "N"
α =	3.133	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.498	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.451	van Genuchten "M"
α_{ao} =	6.225	air/LNAPL "α" [ft^{-1}]
α_{ow} =	1.623	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.249	elevation of air-LNAPL interface [ft]
z_{ow} =	-1.151	elevation of LNAPL-water interface [ft]
z_{max} =	0.749	maximum free-product elevation [ft]
λ =	0.644	pore-size distribution index
Ψ_b =	0.199	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.1b

10/7/2013

AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-700
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.112	0.000	0.002	0.0000	0.002505	0.0000	0.019573		
0.504	0.014	0.060	0.1038	0.034290	0.0972	0.147781	0.0001	Eps-Do
1.400	0.106	0.232	0.3702	0.102596	0.1907	0.191930	0.0001	Eps-kro

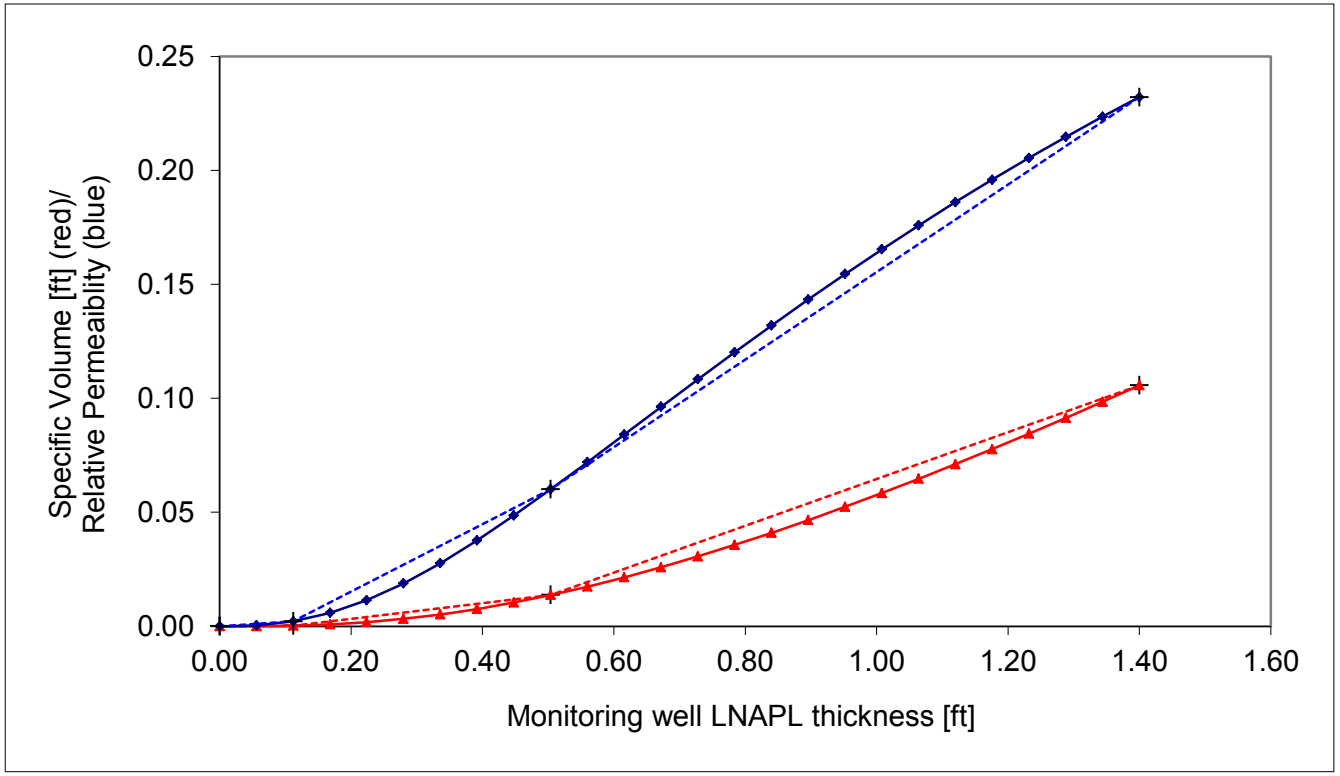


Figure F.1c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-700
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.400
D_o [ft] =	0.106	k_{ro} =	0.232

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

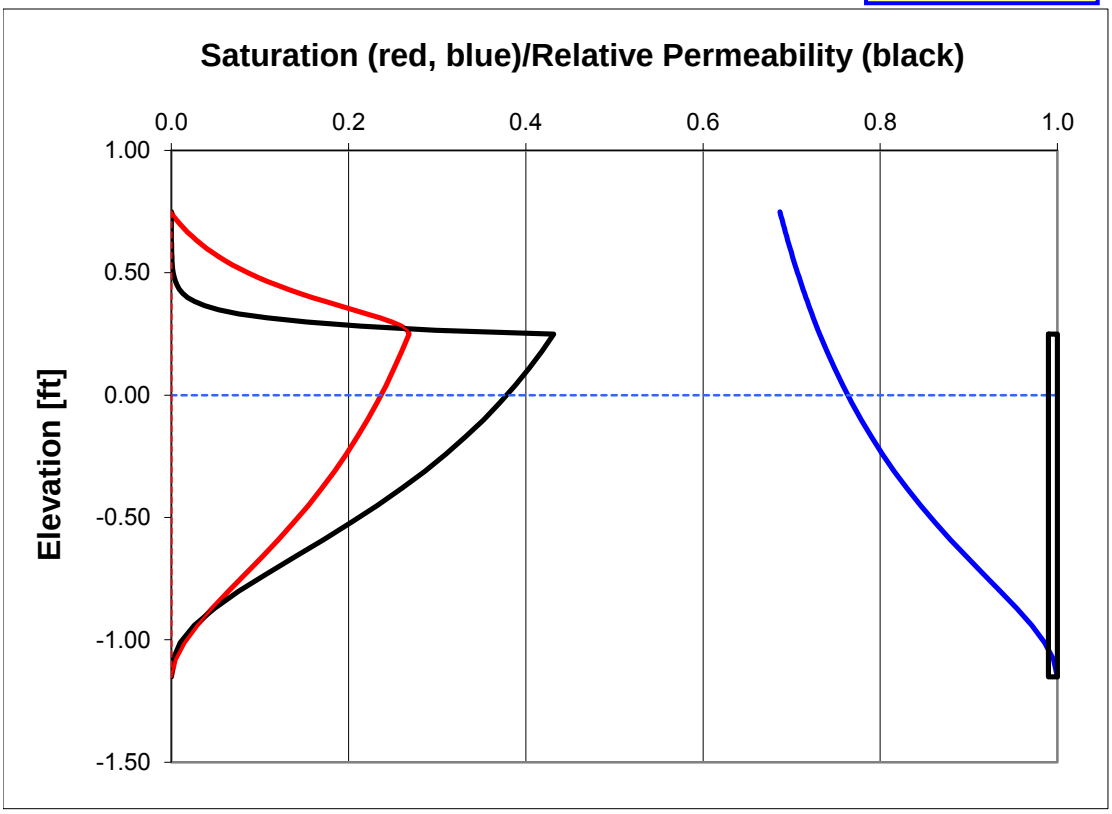


Figure F.2a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-701
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.020

Soil Characteristic		
n =	0.415	porosity
N =	1.820	van Genuchten "N"
α =	3.133	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.498	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.451	van Genuchten "M"
α_{ao} =	6.225	air/LNAPL "α" [ft^{-1}]
α_{ow} =	1.623	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.004	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.016	elevation of LNAPL-water interface [ft]
z_{max} =	0.014	maximum free-product elevation [ft]
λ =	0.644	pore-size distribution index
Ψ_b =	0.199	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.2b

10/7/2013

AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-701
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.002	0.000	0.000	0.0000	0.000001	0.0000	0.000028		
0.007	0.000	0.000	0.0015	0.000022	0.0015	0.000368	0.0001	Eps-Do
0.020	0.000	0.000	0.0064	0.000166	0.0062	0.002056	0.0001	Eps-kro

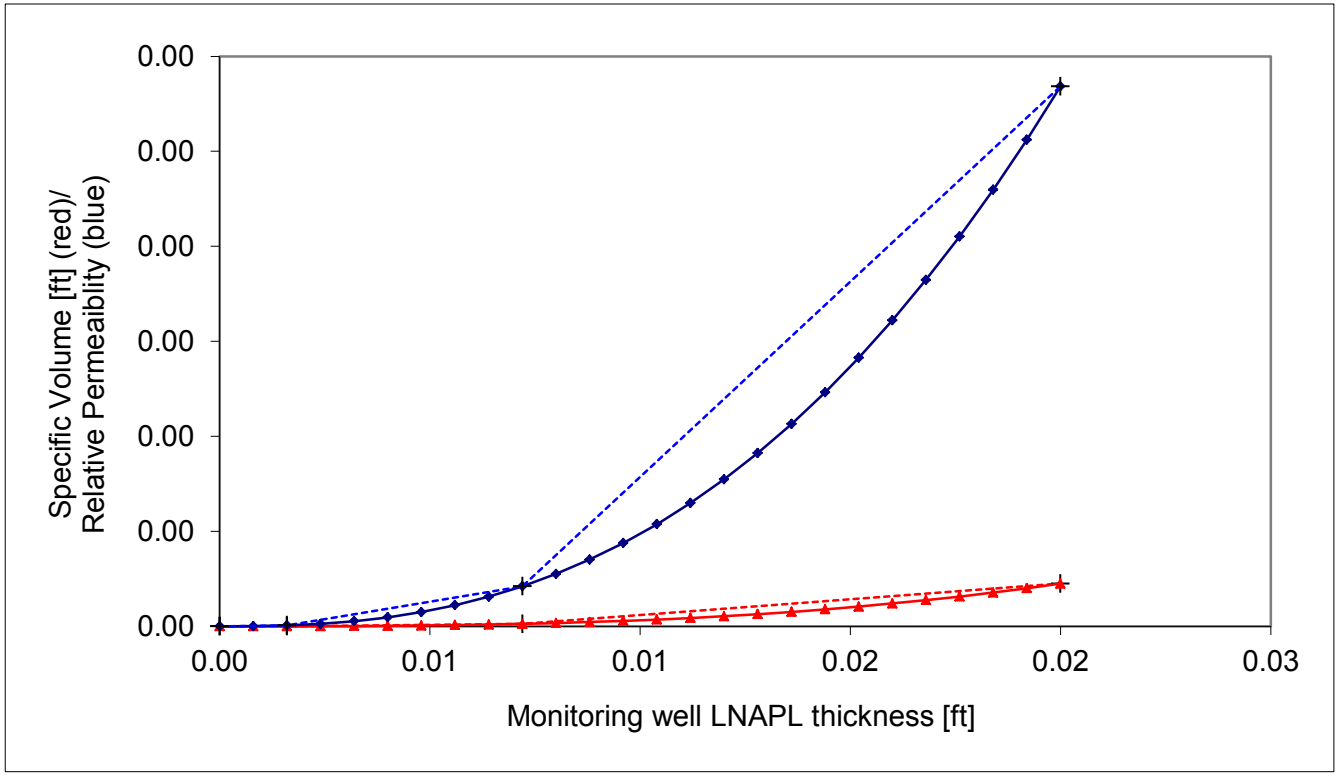


Figure F.2c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = RW-701
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.020
D_o [ft] =	0.000	k_{ro} =	0.000

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

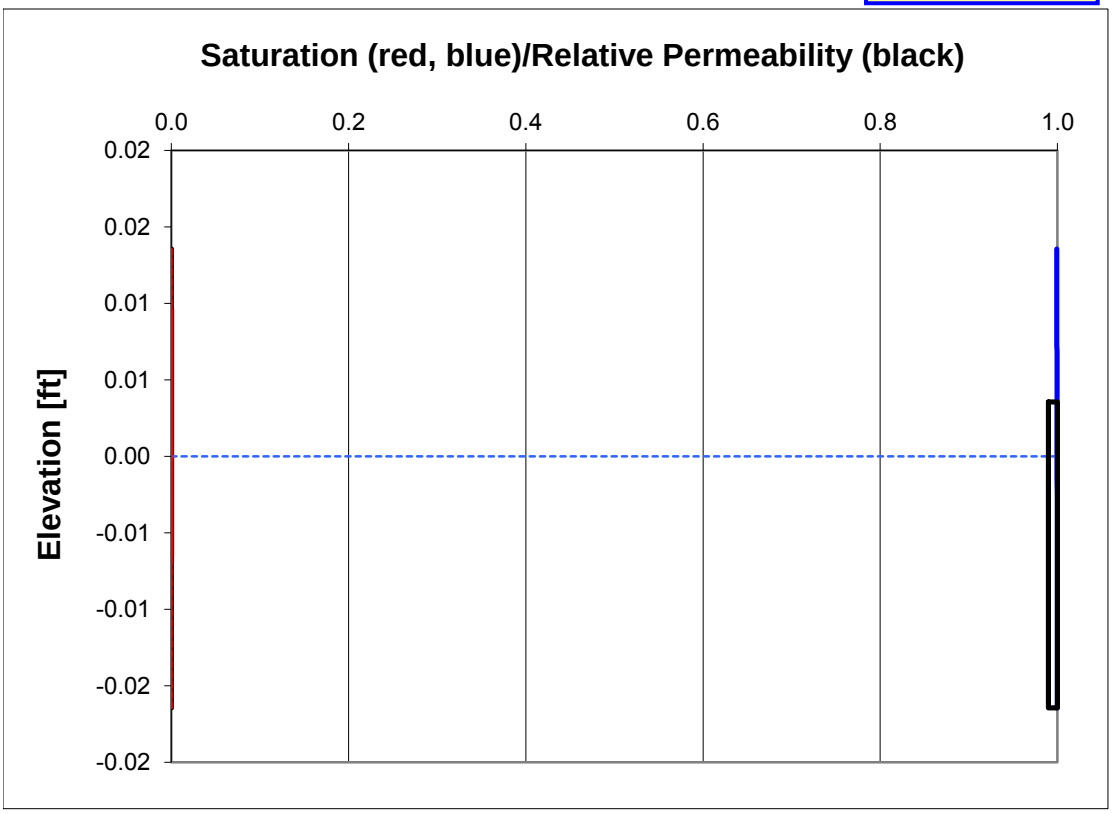


Figure F.3a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-123
Soil Type = SW
Fluid Type = Middle Distillate

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.040

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.865	LNAPL density [gm/cc]
σ_{aw} =	57.700	air/water surface tension [dyne/cm]
σ_{ao} =	28.600	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	16.600	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	16.438	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.409	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.005	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.035	elevation of LNAPL-water interface [ft]
z_{max} =	0.035	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.3b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-123
Soil Type = SW
Fluid Type = Middle Distillate

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.003	0.000	0.000	0.0000	0.000000	0.0000	0.000000		
0.014	0.000	0.000	0.0032	0.000028	0.0032	0.000001	0.0001	Eps-Do
0.040	0.000	0.000	0.0141	0.000948	0.0144	0.000341	0.0001	Eps-kro

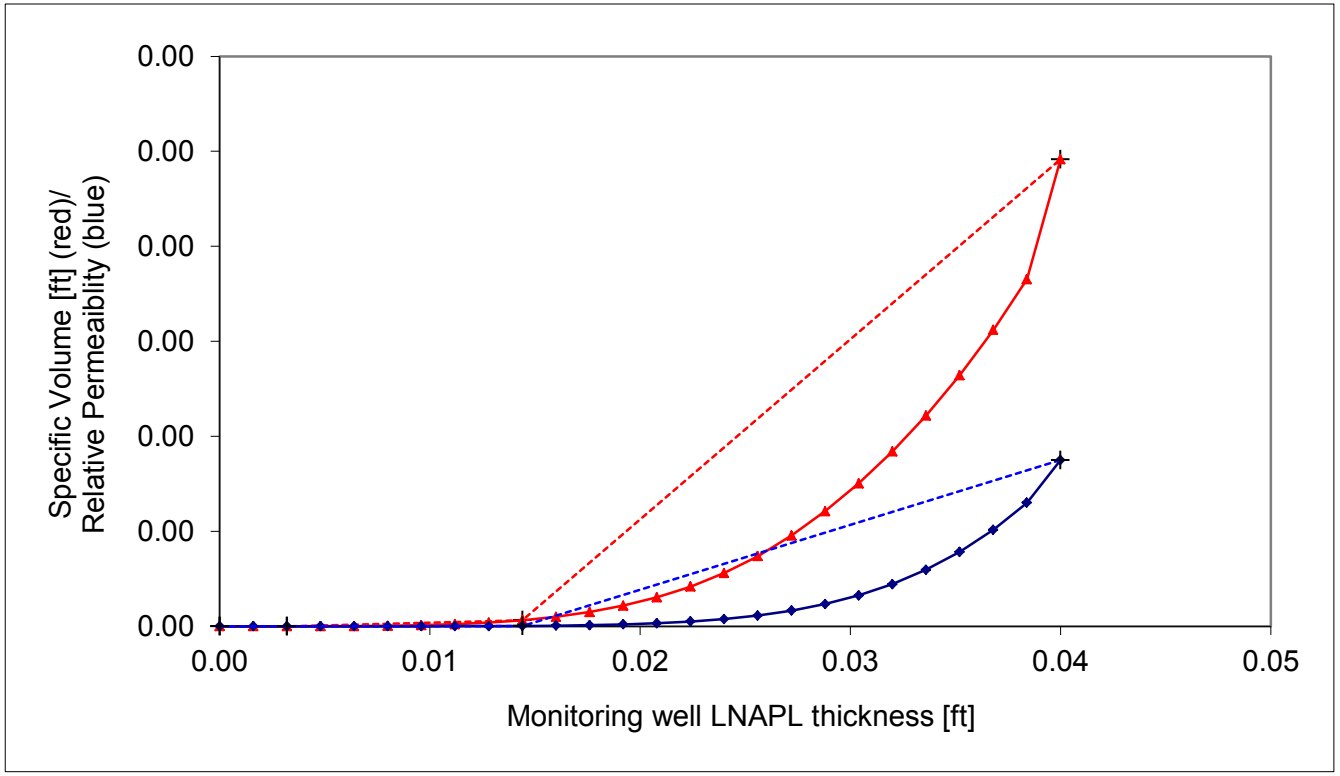


Figure F.3c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-123
Soil Type = SW
Fluid Type = Middle Distillate

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.040
D_o [ft] =	0.000	k_{ro} =	0.000

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

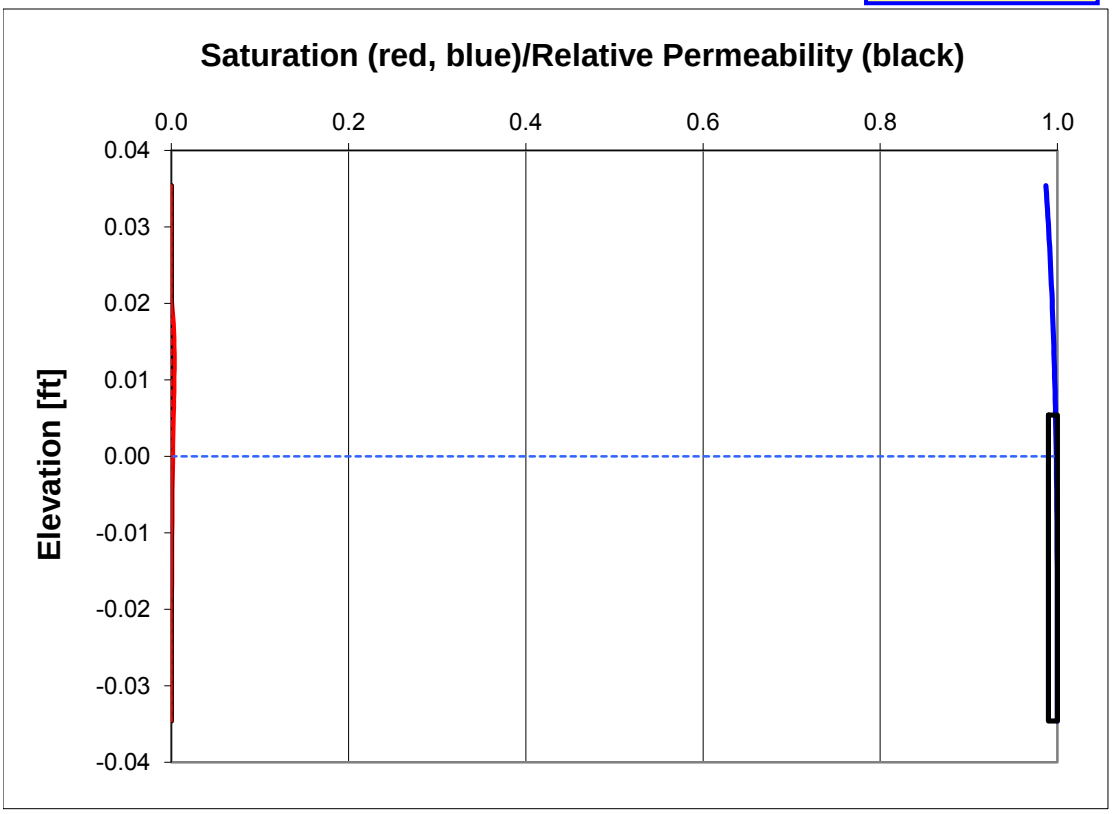


Figure F.4a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-233
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.280

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.227	elevation of air-LNAPL interface [ft]
z_{ow} =	-1.053	elevation of LNAPL-water interface [ft]
z_{max} =	0.637	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.4b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-233
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.102	0.002	0.004	0.0000	0.015752	0.0000	0.038456		
0.461	0.099	0.394	0.0965	0.271175	0.0988	1.089621	0.0001	Eps-Do
1.280	0.412	0.720	0.2023	0.382271	-0.5304	0.397958	0.0001	Eps-kro

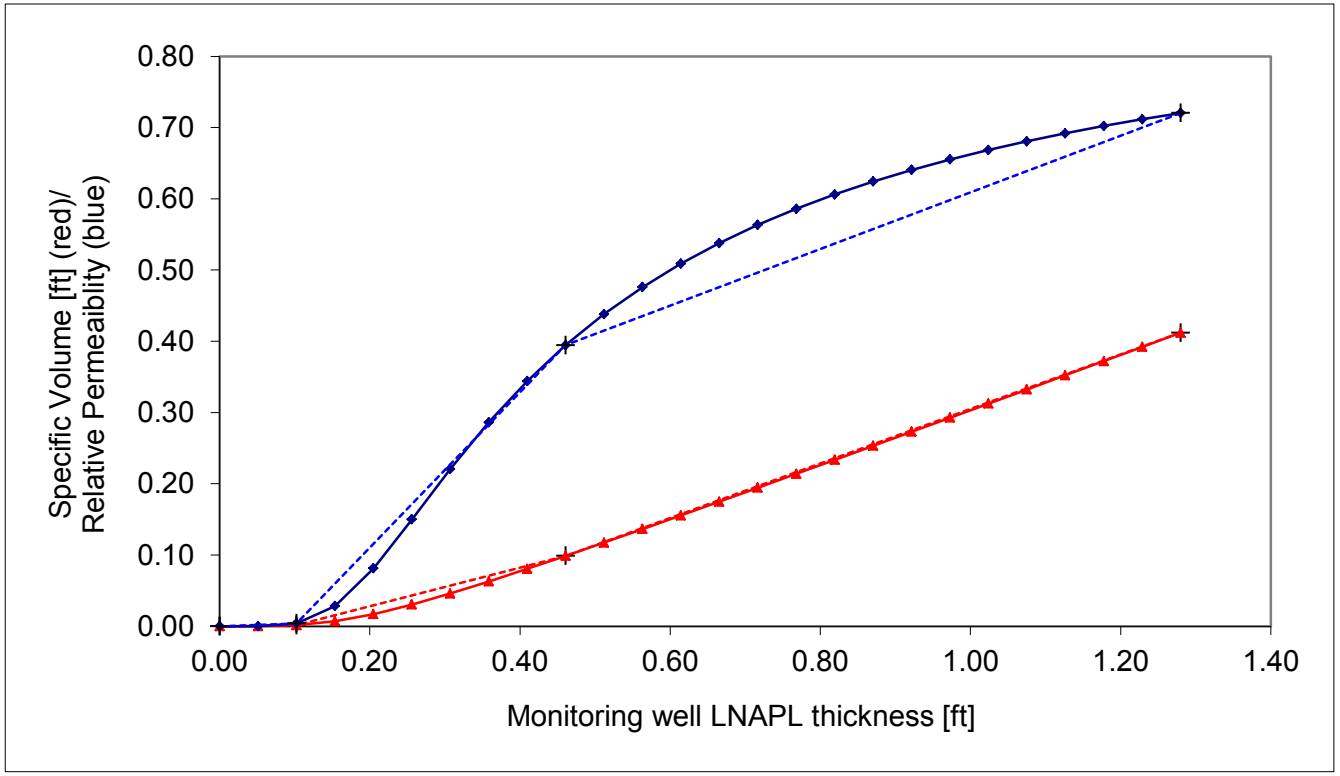


Figure F.4c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-233
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.280
D_o [ft] =	0.412	k_{ro} =	0.720

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

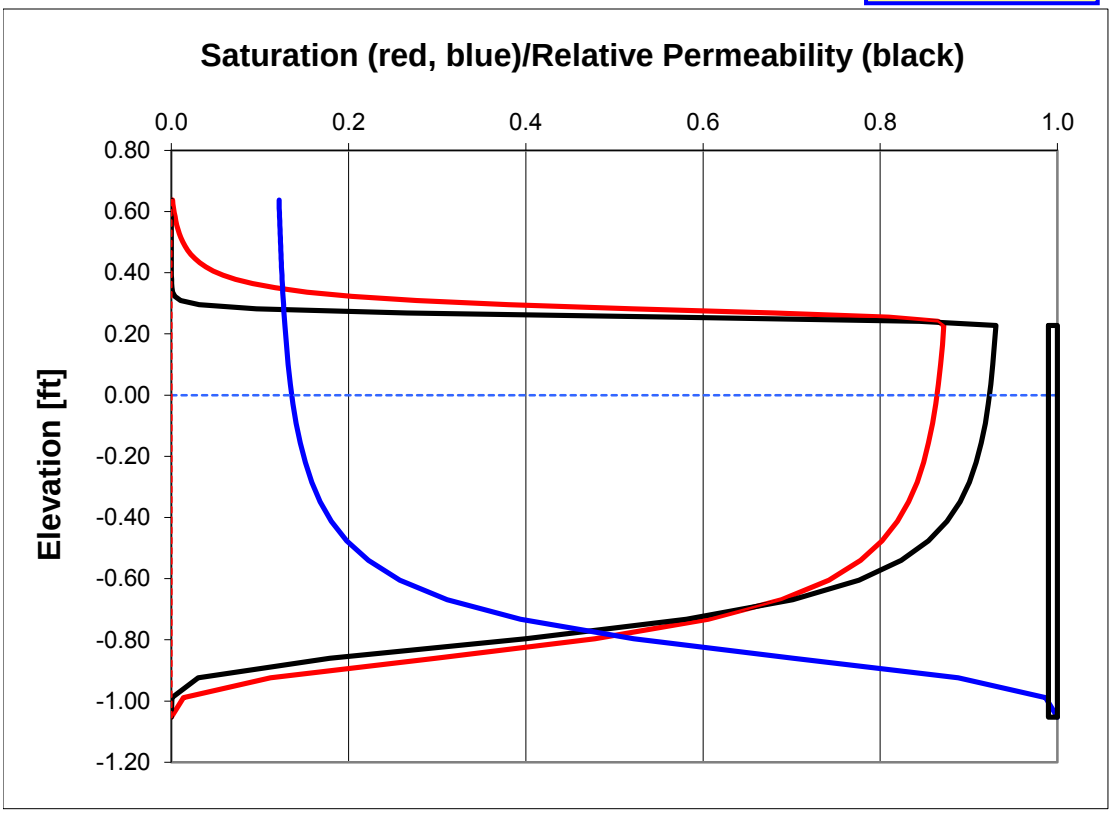


Figure F.5a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-235
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.120

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.199	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.921	elevation of LNAPL-water interface [ft]
z_{max} =	0.569	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.5b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-235
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.090	0.001	0.002	0.0000	0.010610	0.0000	0.021071		
0.403	0.078	0.337	0.0857	0.246578	0.0878	1.069466	0.0001	Eps-Do
1.120	0.350	0.691	0.1965	0.378734	-0.2810	0.492936	0.0001	Eps-kro

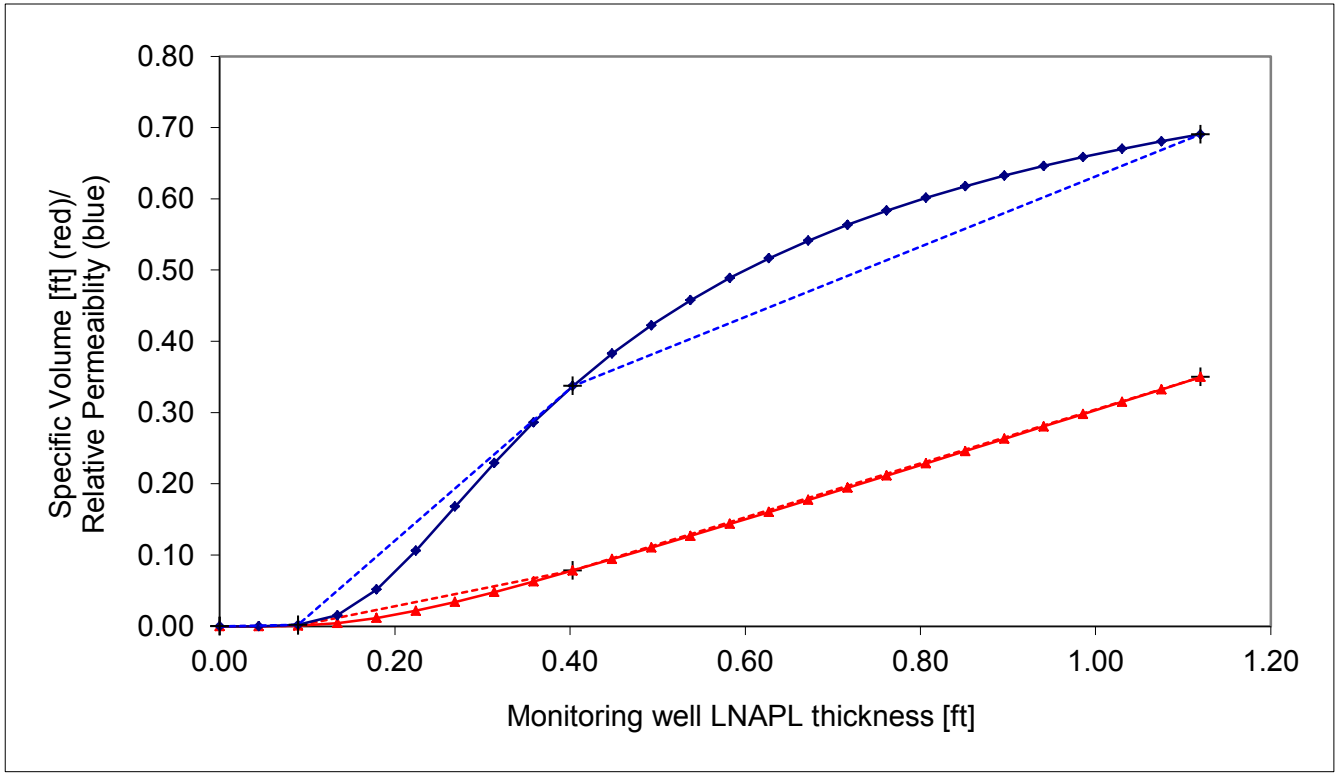


Figure F.5c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-235
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.120
D_o [ft] =	0.350	k_{ro} =	0.691

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

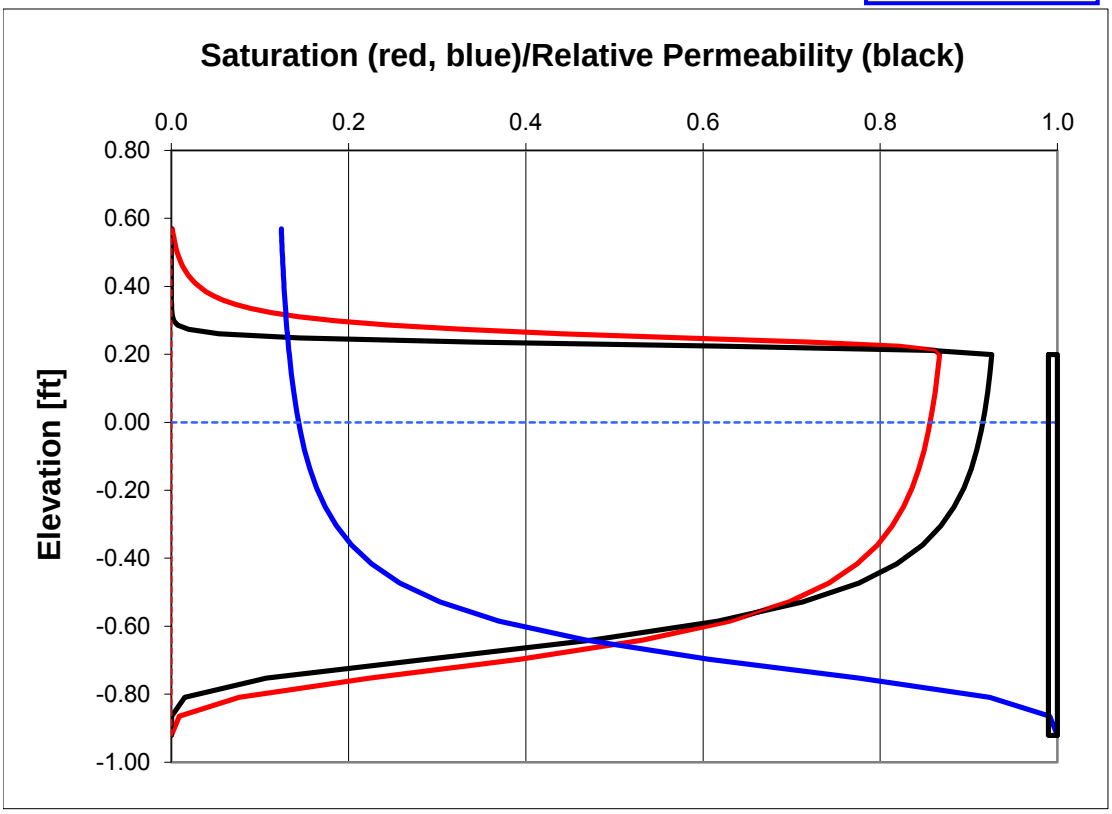


Figure F.6a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-236
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.540

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.274	elevation of air-LNAPL interface [ft]
z_{ow} =	-1.266	elevation of LNAPL-water interface [ft]
z_{max} =	0.734	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.6b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-236
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.123	0.003	0.010	0.0000	0.026429	0.0000	0.083114		
0.554	0.133	0.470	0.1124	0.301250	0.1136	1.065870	0.0001	Eps-Do
1.540	0.513	0.756	0.2092	0.385725	-1.0616	0.290738	0.0001	Eps-kro

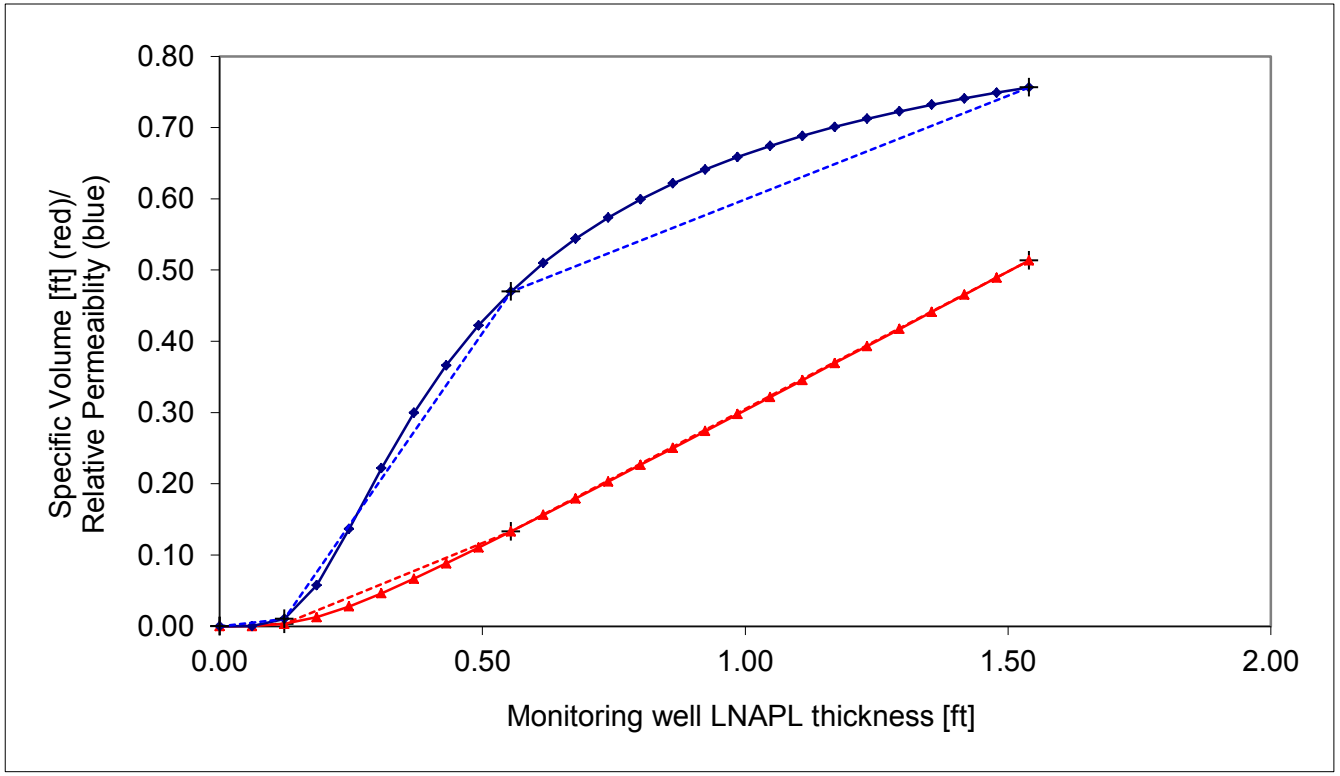


Figure F.6c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-236
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.540
D_o [ft] =	0.513	k_{ro} =	0.756

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

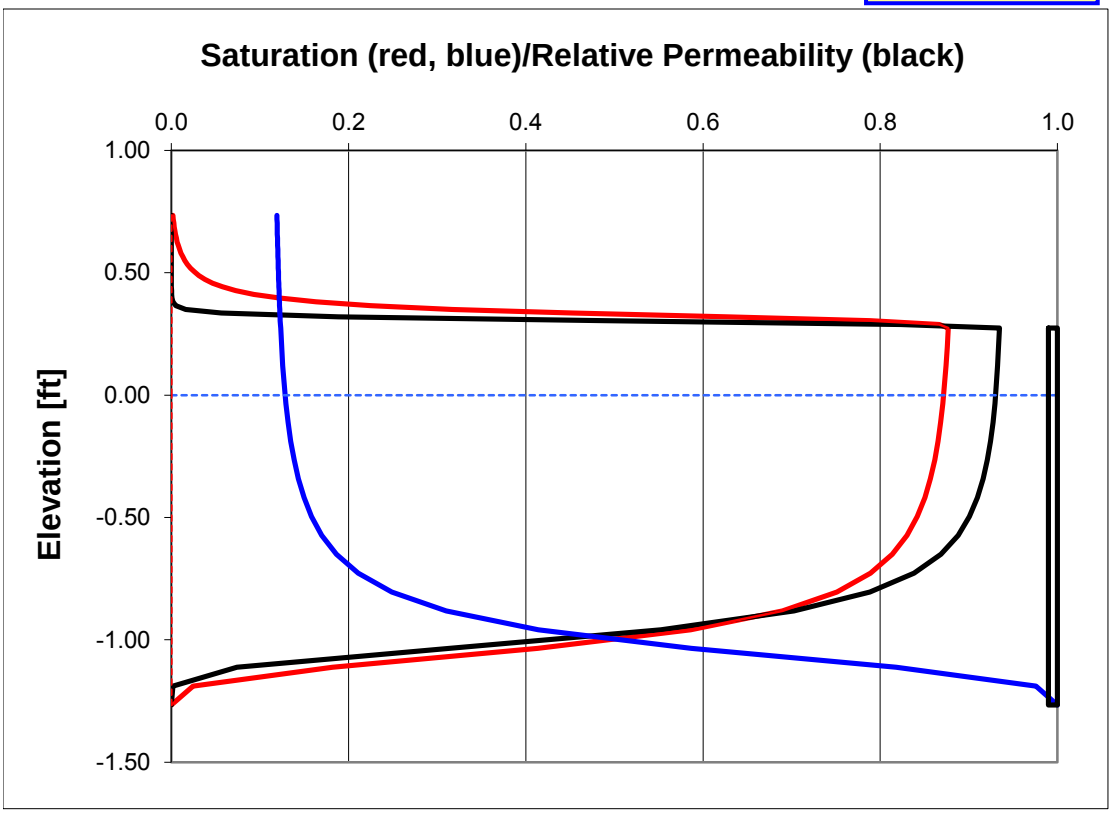


Figure F.7a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-237
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.800

Soil Characteristic		
n =	0.415	porosity
N =	1.820	van Genuchten "N"
α =	3.133	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.498	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.451	van Genuchten "M"
α_{ao} =	6.225	air/LNAPL "α" [ft^{-1}]
α_{ow} =	1.623	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.320	elevation of air-LNAPL interface [ft]
z_{ow} =	-1.480	elevation of LNAPL-water interface [ft]
z_{max} =	0.960	maximum free-product elevation [ft]
λ =	0.644	pore-size distribution index
Ψ_b =	0.199	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.7b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-237
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.144	0.001	0.004	0.0000	0.003884	0.0000	0.028108		
0.648	0.024	0.091	0.1320	0.046444	0.1206	0.172647	0.0001	Eps-Do
1.800	0.160	0.286	0.4457	0.118444	0.1087	0.168866	0.0001	Eps-kro

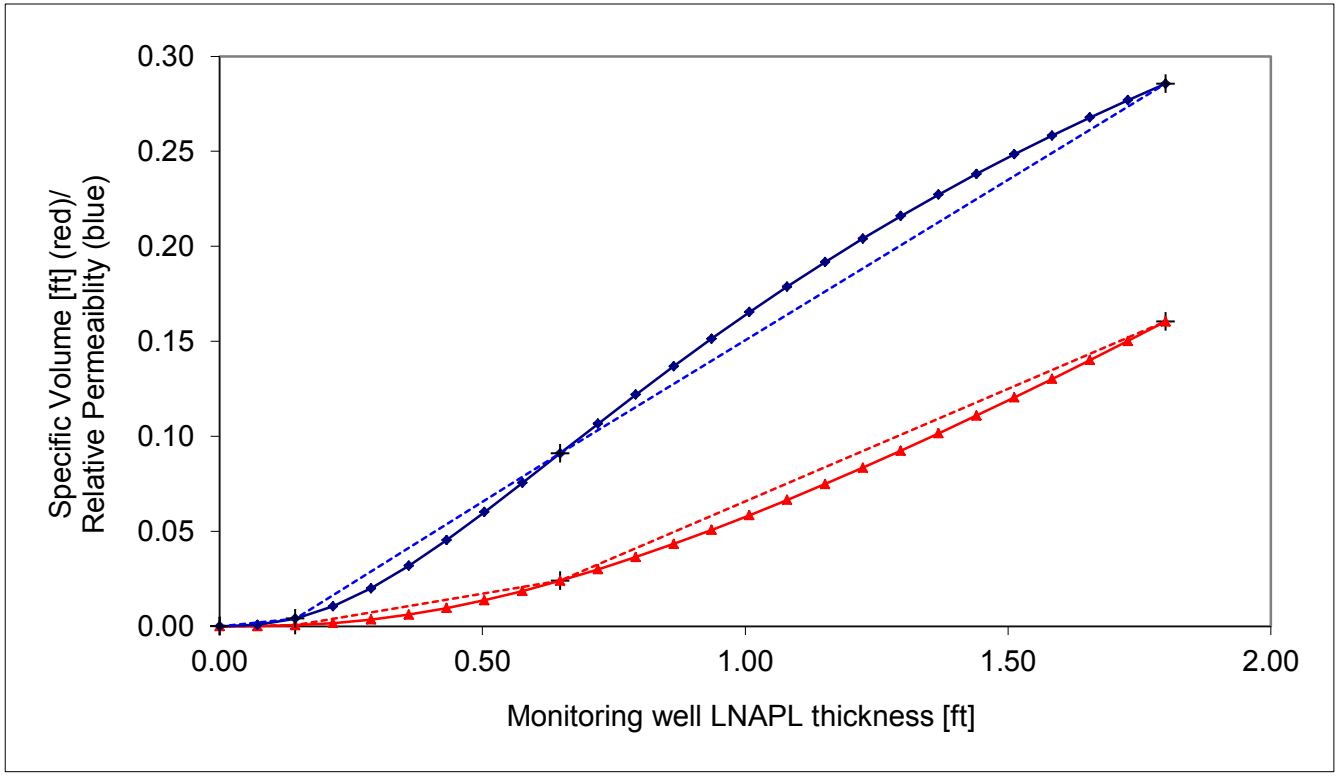


Figure F.7c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-237
Soil Type = s(ML)
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.800
D_o [ft] =	0.160	k_{ro} =	0.286

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

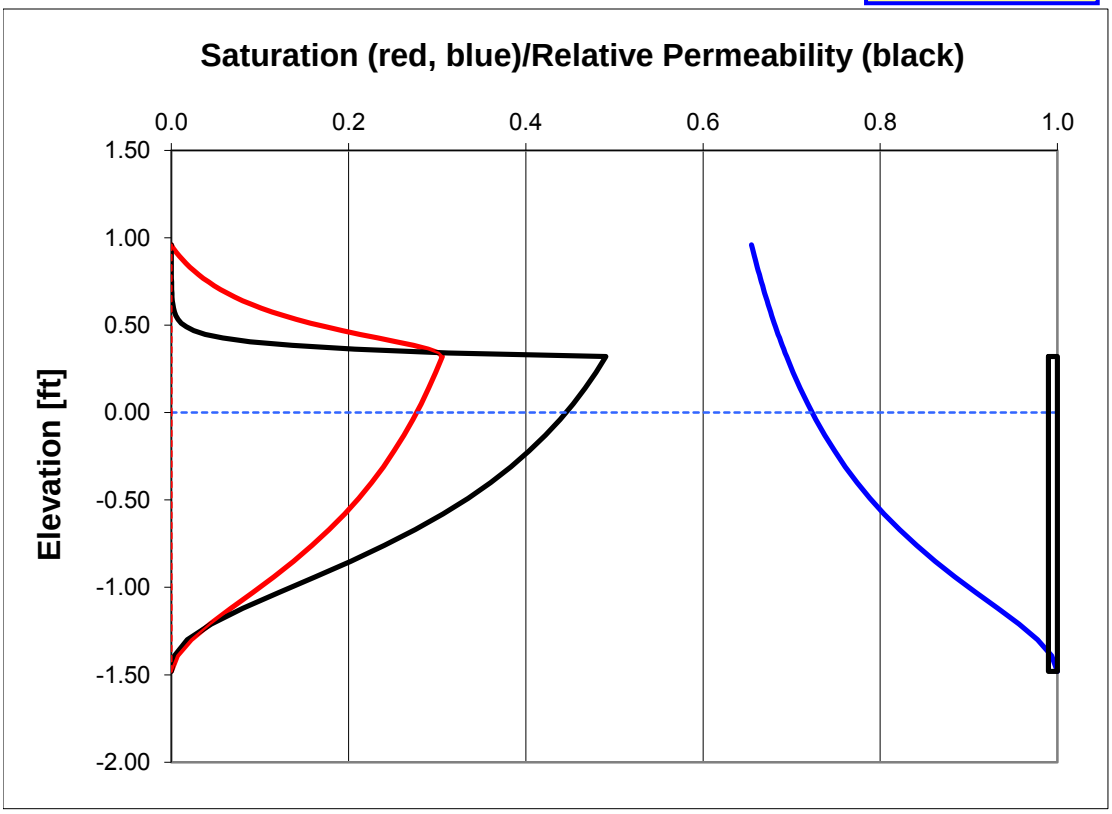


Figure F.8a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-238
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.250

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.044	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.206	elevation of LNAPL-water interface [ft]
z_{max} =	0.144	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.8b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-238
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.020	0.000	0.000	0.0000	0.000087	0.0000	0.000011		
0.090	0.001	0.002	0.0199	0.013801	0.0200	0.027649	0.0001	Eps-Do
0.250	0.029	0.142	0.0844	0.173699	0.0878	0.873535	0.0001	Eps-kro

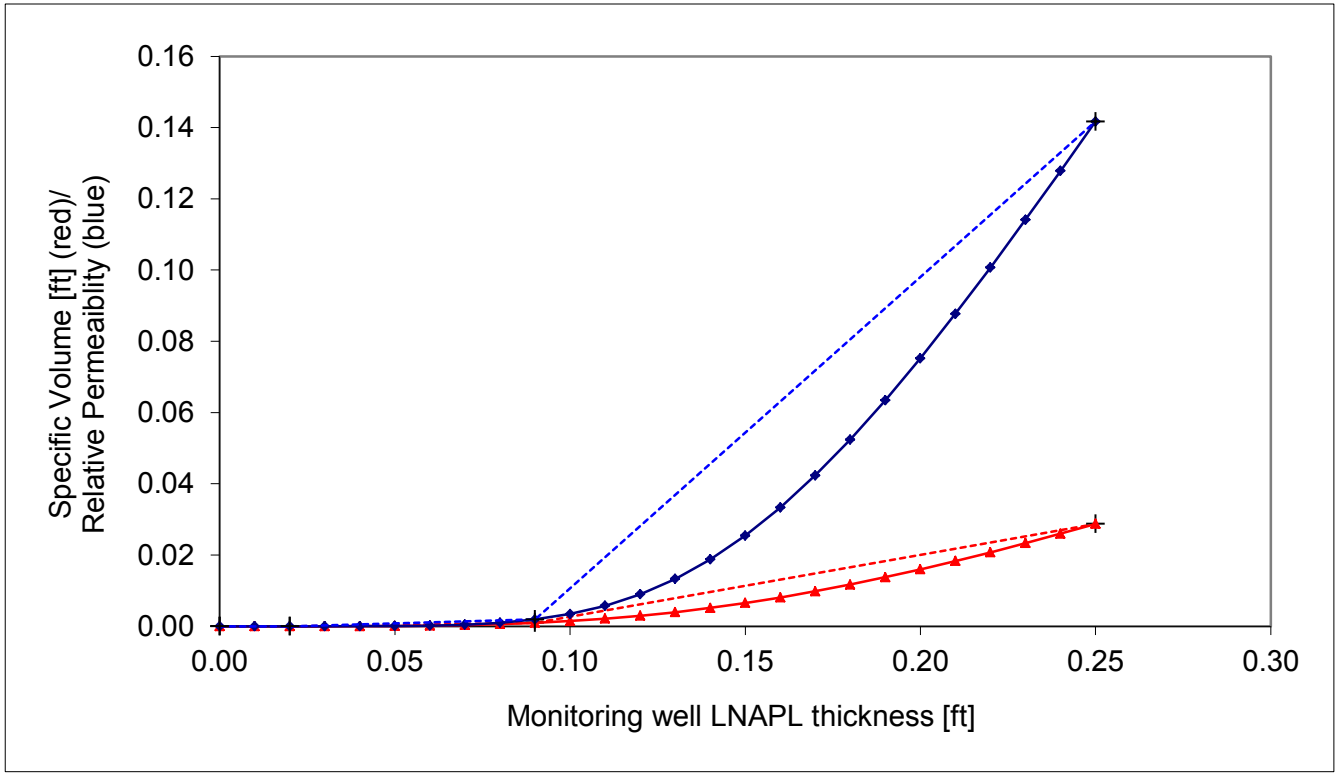


Figure F.8c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-238
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.250
D_o [ft] =	0.029	k_{ro} =	0.142

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

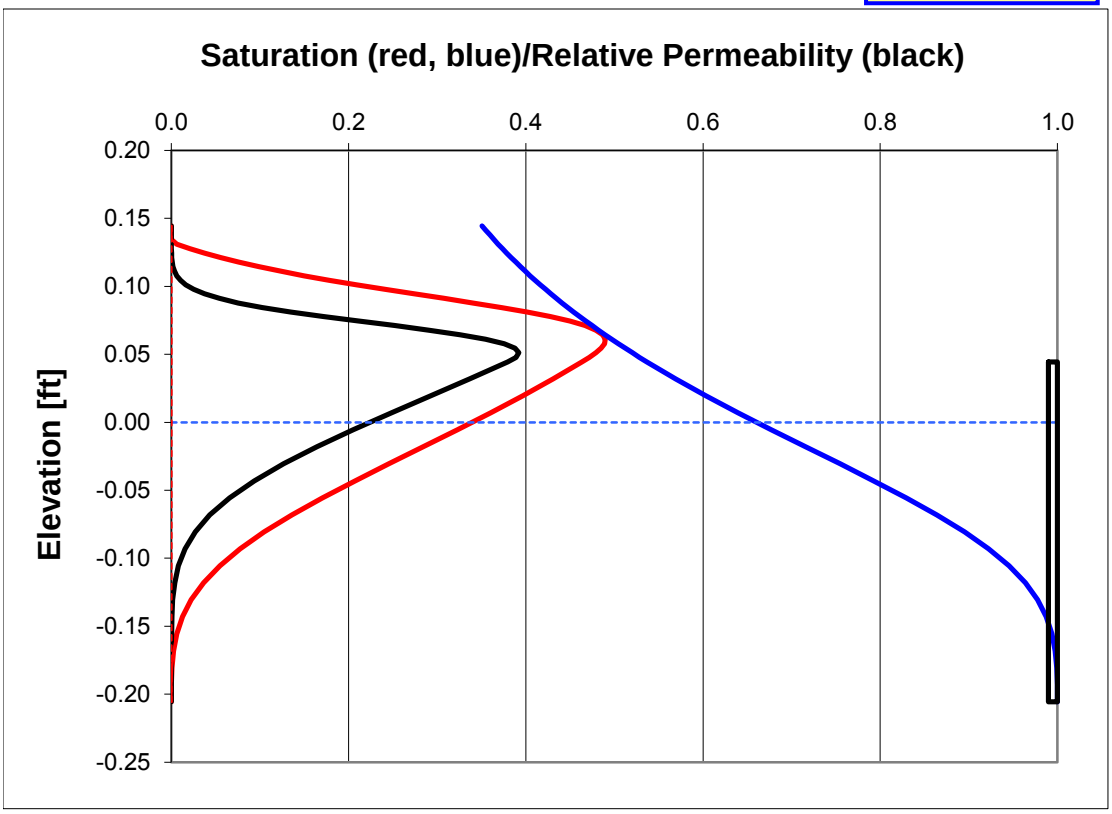


Figure F.9a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-240
Soil Type = SP-SM
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	1.950

Soil Characteristic		
n =	0.404	porosity
N =	2.390	van Genuchten "N"
α =	8.169	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.150	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.582	van Genuchten "M"
α_{ao} =	16.232	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.231	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.347	elevation of air-LNAPL interface [ft]
z_{ow} =	-1.603	elevation of LNAPL-water interface [ft]
z_{max} =	1.007	maximum free-product elevation [ft]
λ =	0.968	pore-size distribution index
Ψ_b =	0.078	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.9b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-240
Soil Type = SP-SM
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.156	0.005	0.030	0.0000	0.033913	0.0000	0.193789		
0.702	0.133	0.431	0.1333	0.233487	0.1148	0.733267	0.0001	Eps-Do
1.950	0.532	0.702	0.2871	0.320035	-1.2752	0.217778	0.0001	Eps-kro

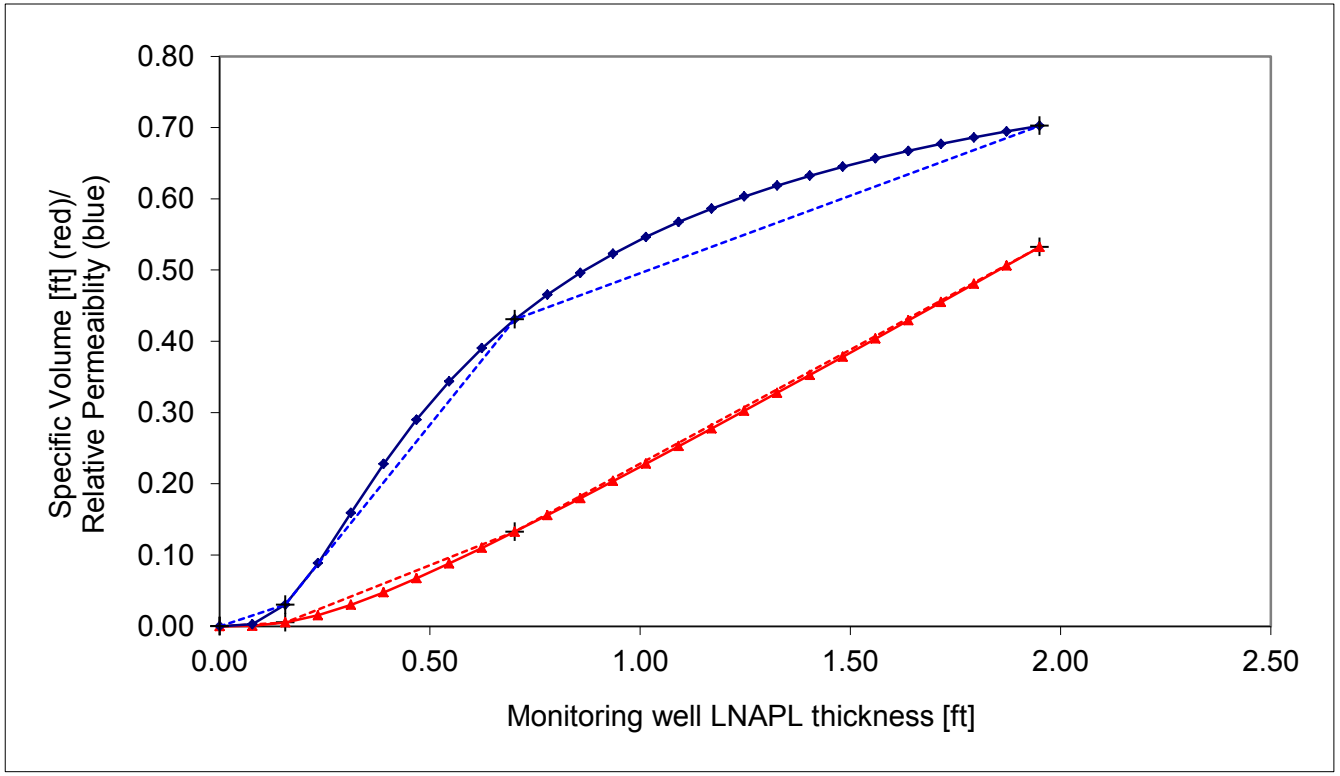


Figure F.9c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-240
Soil Type = SP-SM
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			1.950
D_o [ft] =	0.532	k_{ro} =	0.702

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

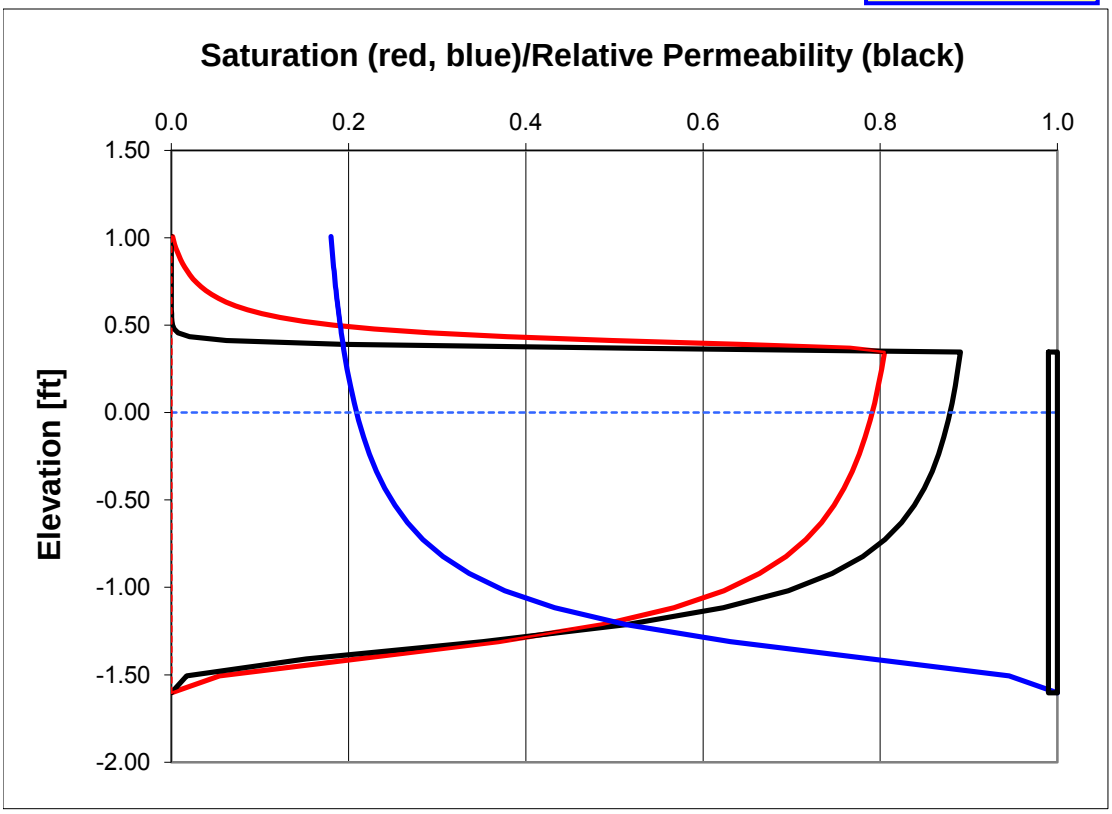


Figure F.10a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-241
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	2.550

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.453	elevation of air-LNAPL interface [ft]
z_{ow} =	-2.097	elevation of LNAPL-water interface [ft]
z_{max} =	1.063	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.10b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-241
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.204	0.017	0.080	0.0000	0.082808	0.0000	0.392898		
0.918	0.272	0.639	0.1566	0.356669	0.1017	0.783234	0.0001	Eps-Do
2.550	0.908	0.828	0.2222	0.390281	-4.6068	0.115730	0.0001	Eps-kro

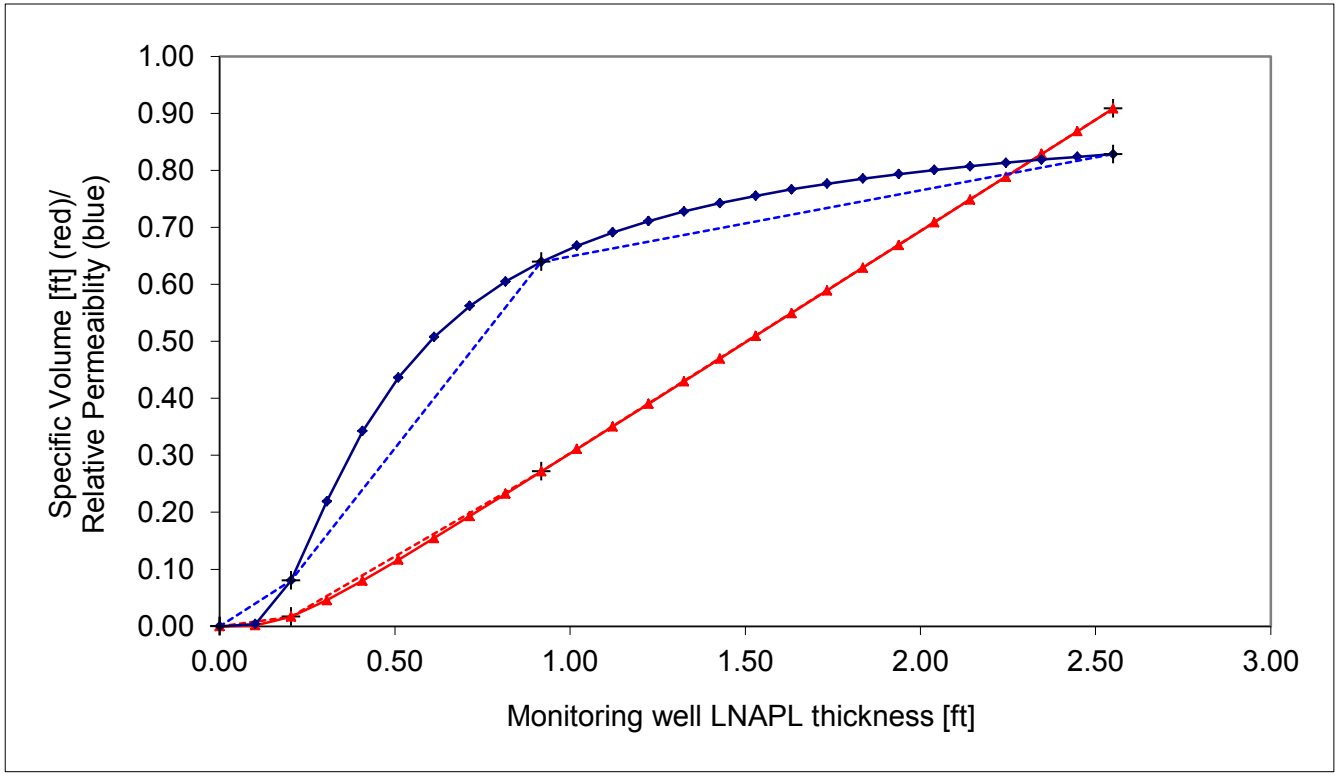


Figure F.10c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-241
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			2.550
D_o [ft] =	0.908	k_{ro} =	0.828

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

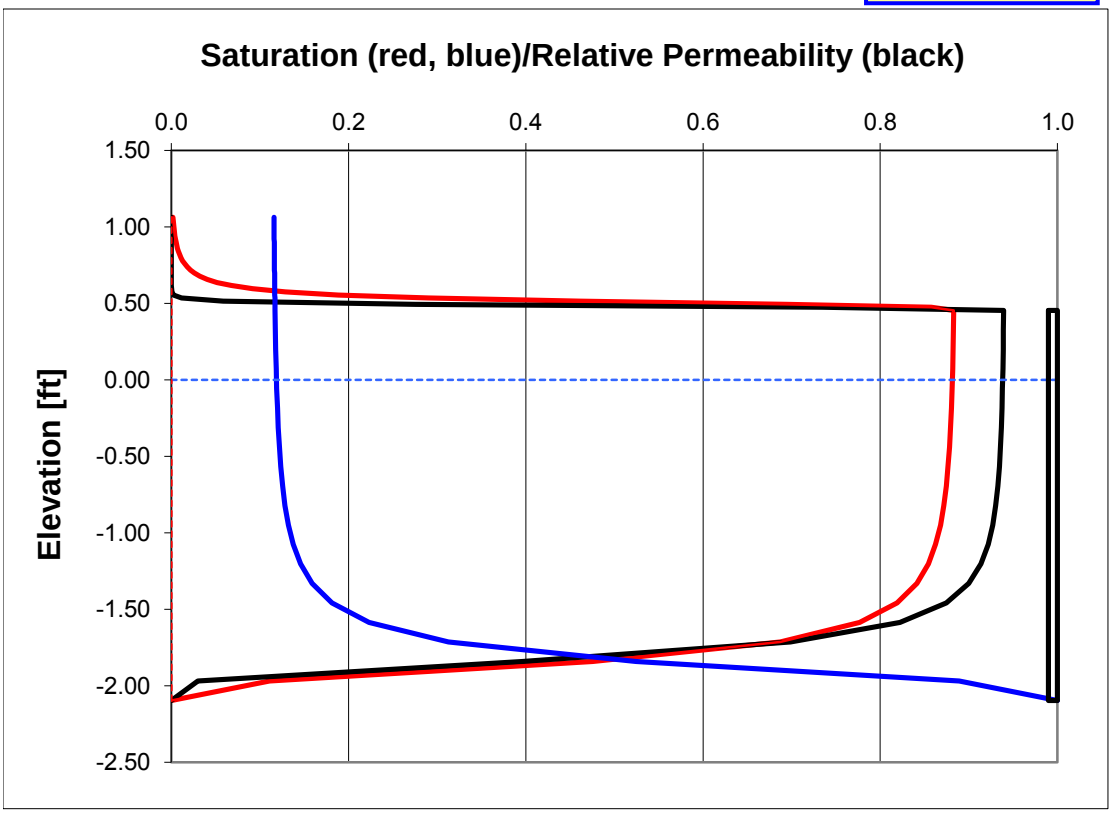


Figure F.11a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-278
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.960

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.171	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.789	elevation of LNAPL-water interface [ft]
z_{max} =	0.501	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.11b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-278
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.077	0.001	0.001	0.0000	0.006620	0.0000	0.010178		
0.346	0.059	0.271	0.0744	0.215797	0.0760	1.003467	0.0001	Eps-Do
0.960	0.288	0.652	0.1888	0.373140	-0.0905	0.620330	0.0001	Eps-kro

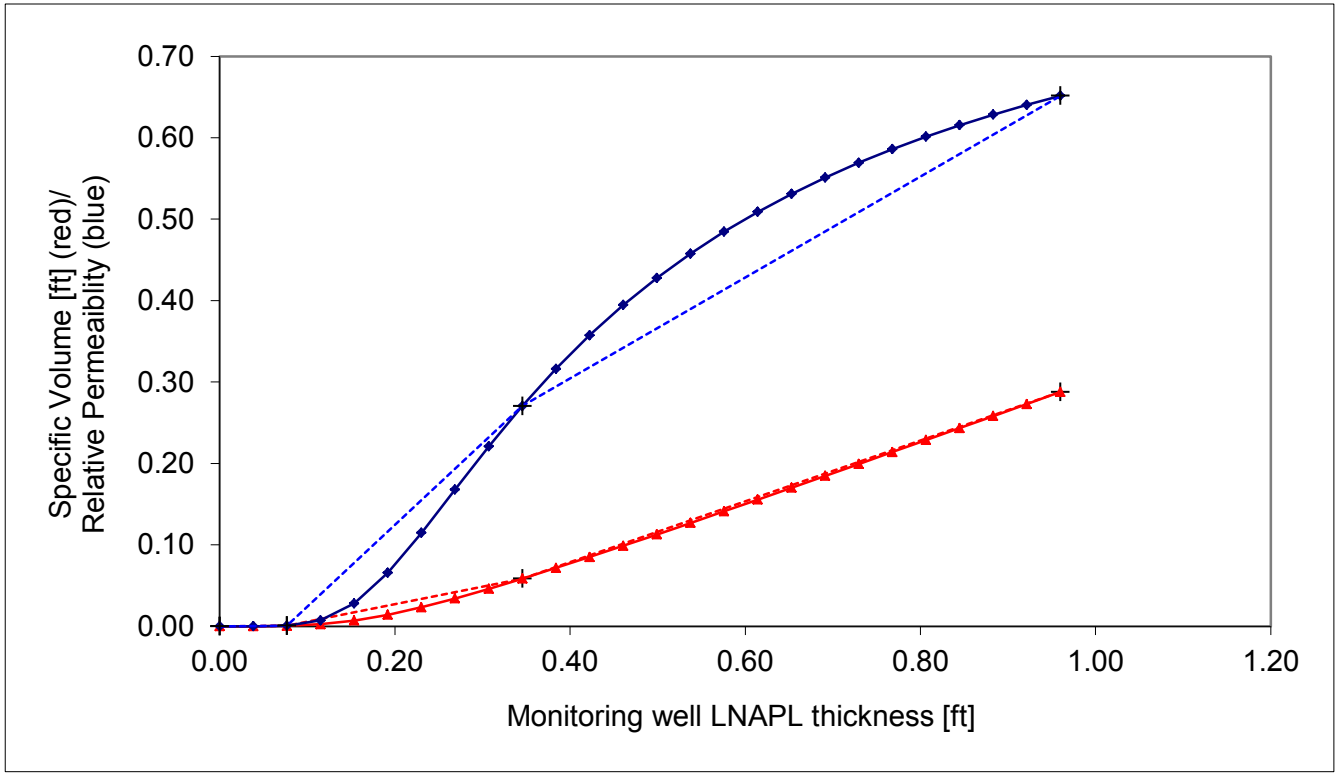


Figure F.11c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-278
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.960
D_o [ft] =	0.288	k_{ro} =	0.652

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

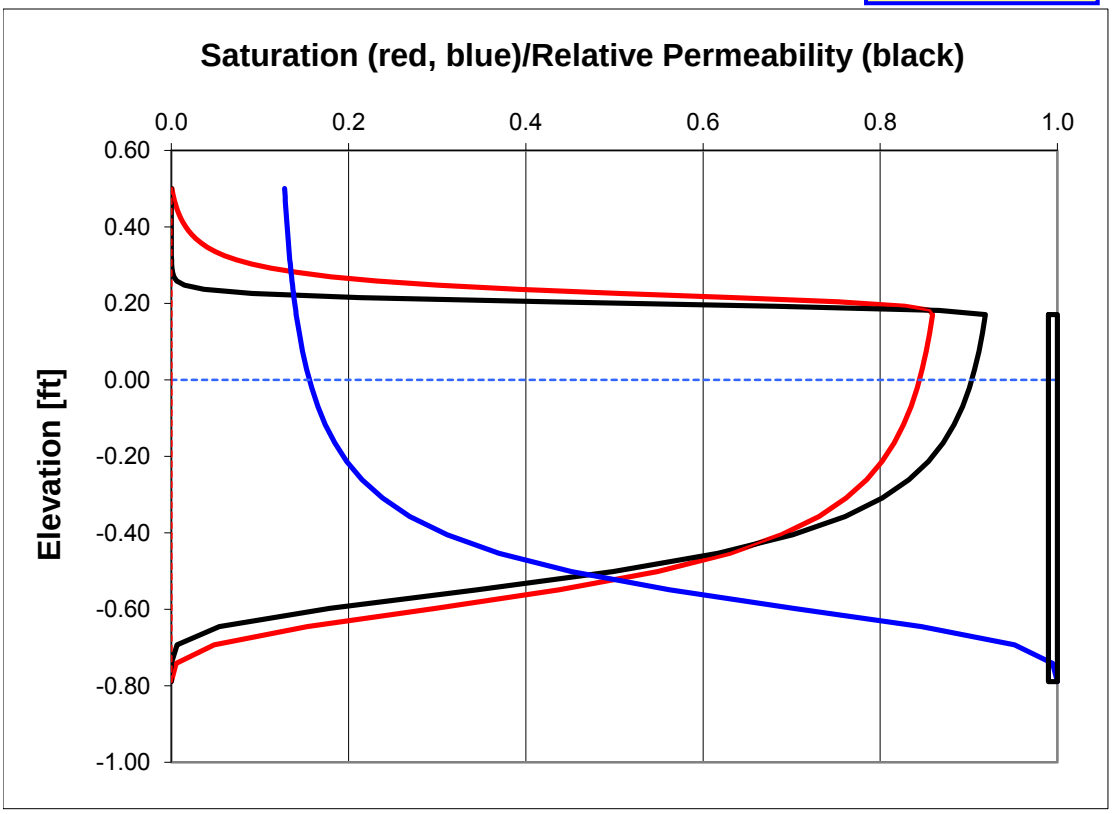


Figure F.12a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-279
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.050

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.822	LNAPL density [gm/cc]
σ_{aw} =	65.000	air/water surface tension [dyne/cm]
σ_{ao} =	26.900	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	22.300	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	18.709	air/LNAPL "α" [ft^{-1}]
α_{ow} =	4.877	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.009	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.041	elevation of LNAPL-water interface [ft]
z_{max} =	0.039	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.12b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-279
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.004	0.000	0.000	0.0000	0.000000	0.0000	0.000000		
0.018	0.000	0.000	0.0040	0.000079	0.0040	0.000008	0.0001	Eps-Do
0.050	0.000	0.000	0.0176	0.002615	0.0179	0.001887	0.0001	Eps-kro

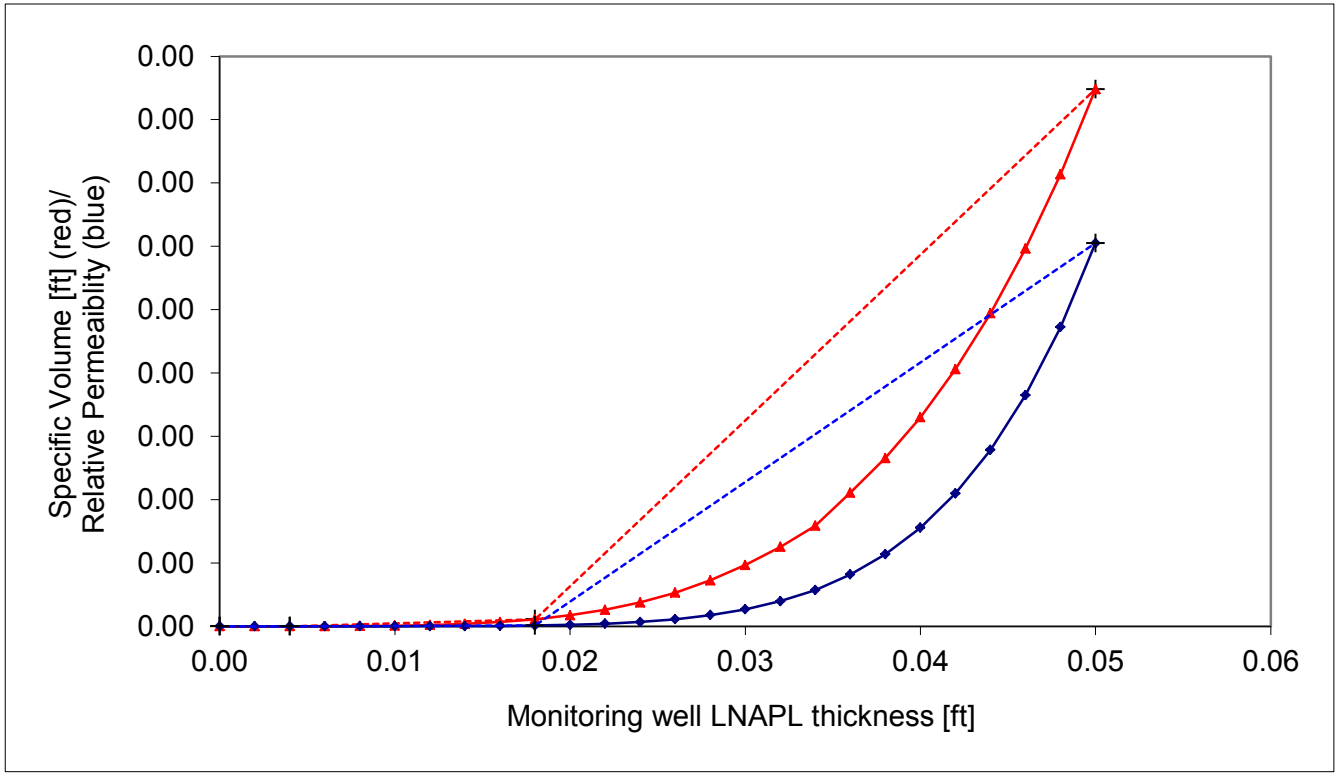


Figure F.12c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-279
Soil Type = SW
Fluid Type = Coker Naphtha/Middle Distillate Mixture

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.050
D_o [ft] =	0.000	k_{ro} =	0.000

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

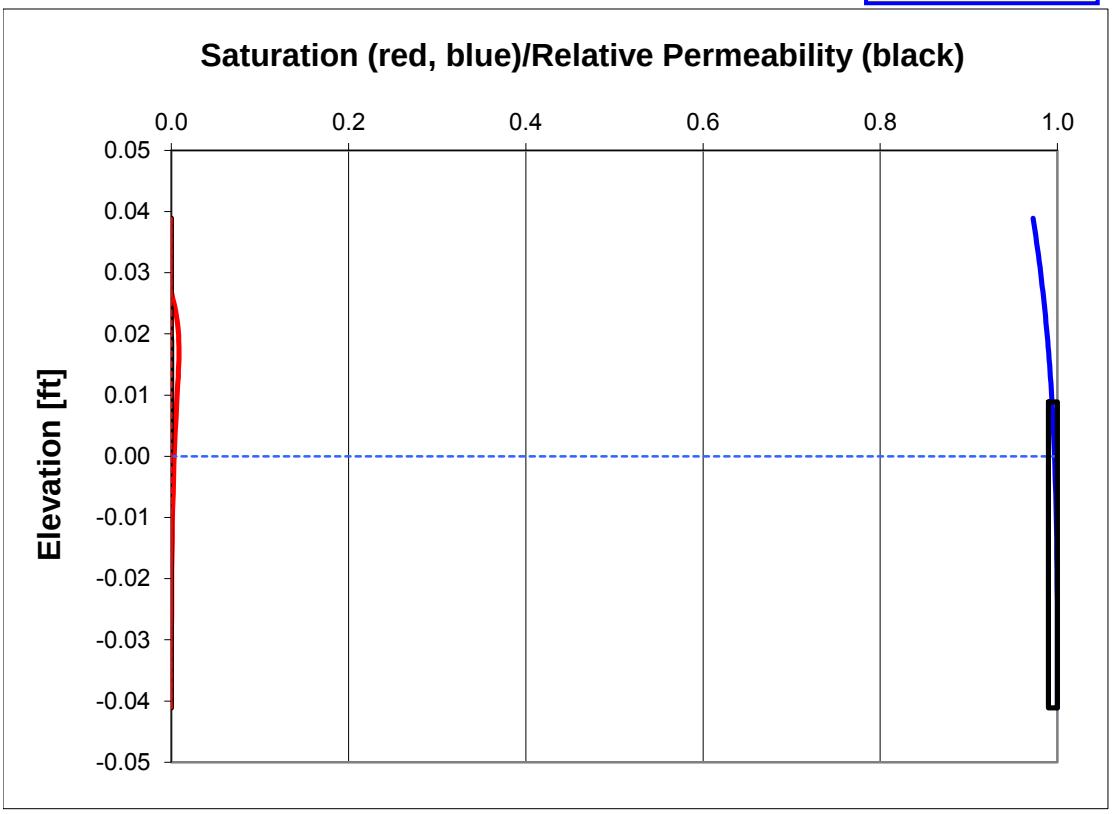


Figure F.13a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-282
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.950

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.816	LNAPL density [gm/cc]
σ_{aw} =	65.700	air/water surface tension [dyne/cm]
σ_{ao} =	23.300	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	14.400	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	21.660	air/LNAPL "α" [ft^{-1}]
α_{ow} =	7.913	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.175	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.775	elevation of LNAPL-water interface [ft]
z_{max} =	0.605	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.13b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-282
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

10/7/2013

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.076	0.003	0.016	0.0000	0.039216	0.0000	0.210244		
0.342	0.089	0.491	0.0668	0.322277	0.0671	1.785677	0.0001	Eps-Do
0.950	0.324	0.765	0.1132	0.387662	-0.7483	0.450306	0.0001	Eps-kro

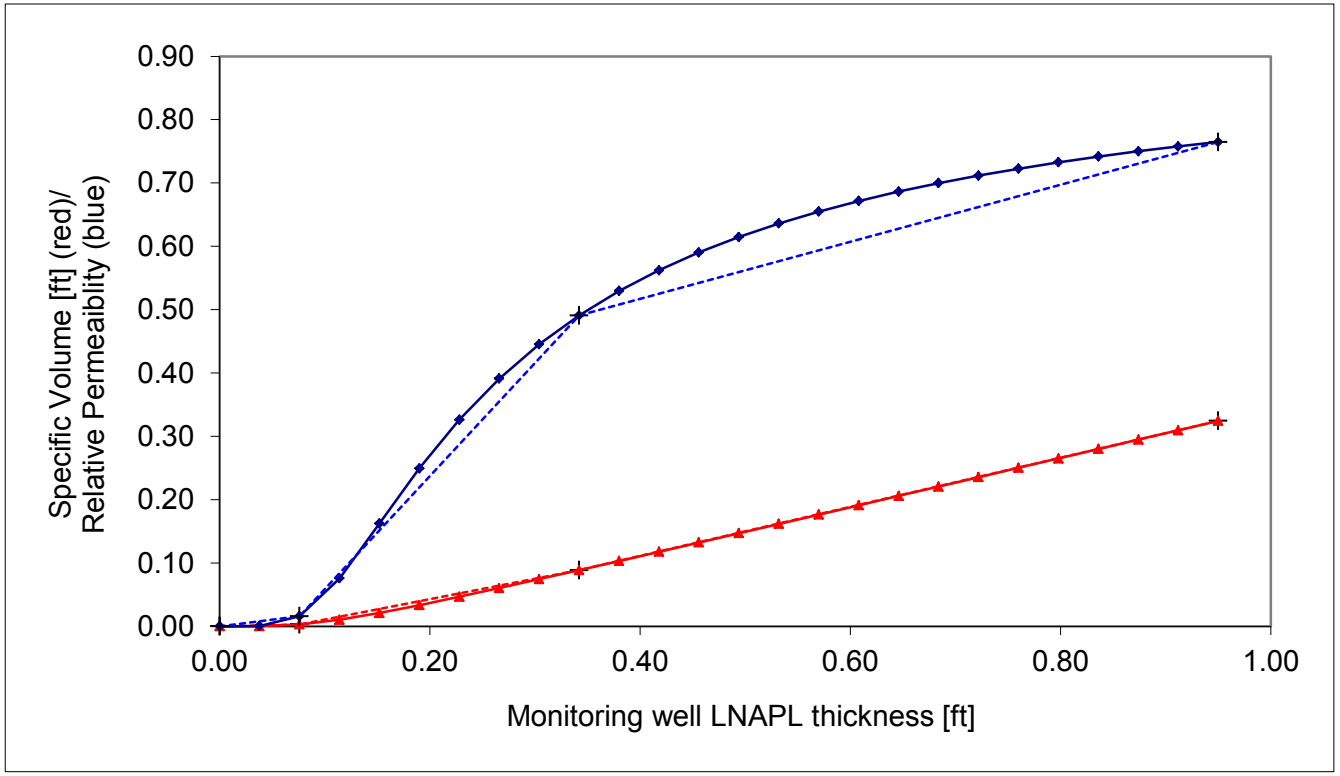


Figure F.13c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-282
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

Monitoring Well LNAPL Thickness b_o [ft] =			0.950
D_o [ft] =	0.324	k_{ro} =	0.765

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

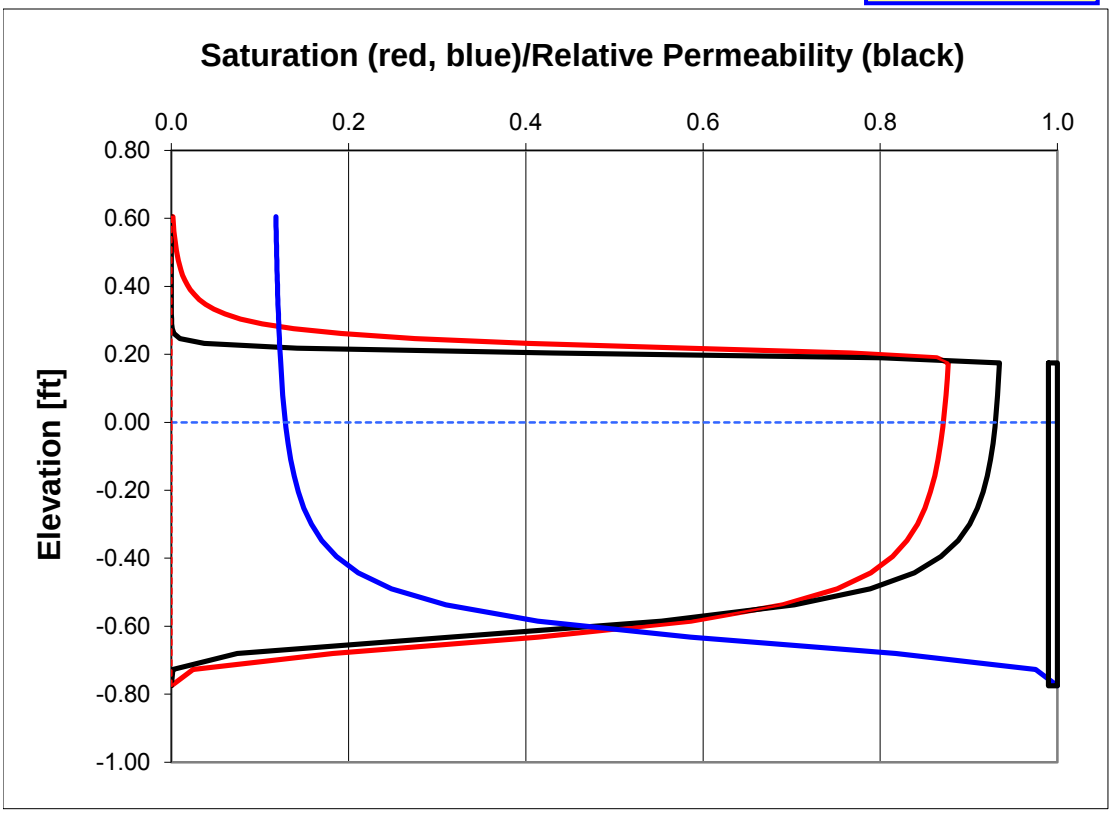


Figure F.14a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-365
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.100

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.816	LNAPL density [gm/cc]
σ_{aw} =	65.700	air/water surface tension [dyne/cm]
σ_{ao} =	23.300	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	14.400	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	21.660	air/LNAPL "α" [ft^{-1}]
α_{ow} =	7.913	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.018	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.082	elevation of LNAPL-water interface [ft]
z_{max} =	0.088	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.14b

10/7/2013

AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-365
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.008	0.000	0.000	0.0000	0.000035	0.0000	0.000004		
0.036	0.000	0.000	0.0080	0.005818	0.0080	0.010097	0.0001	Eps-Do
0.100	0.007	0.049	0.0345	0.109592	0.0356	0.757930	0.0001	Eps-kro

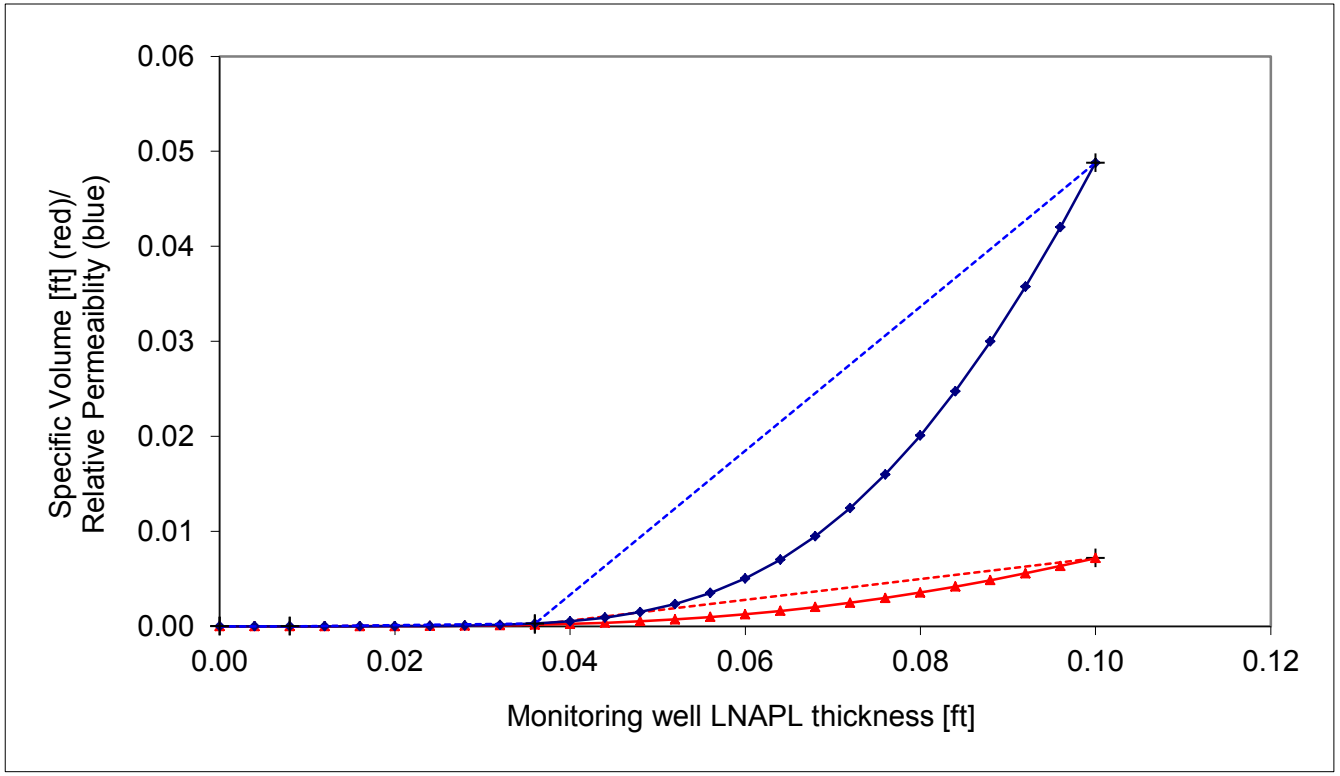


Figure F.14c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-365
Soil Type = SW
Fluid Type = Unknown Light Material/Middle Distillate

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.100
D_o [ft] =	0.007	k_{ro} =	0.049

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet

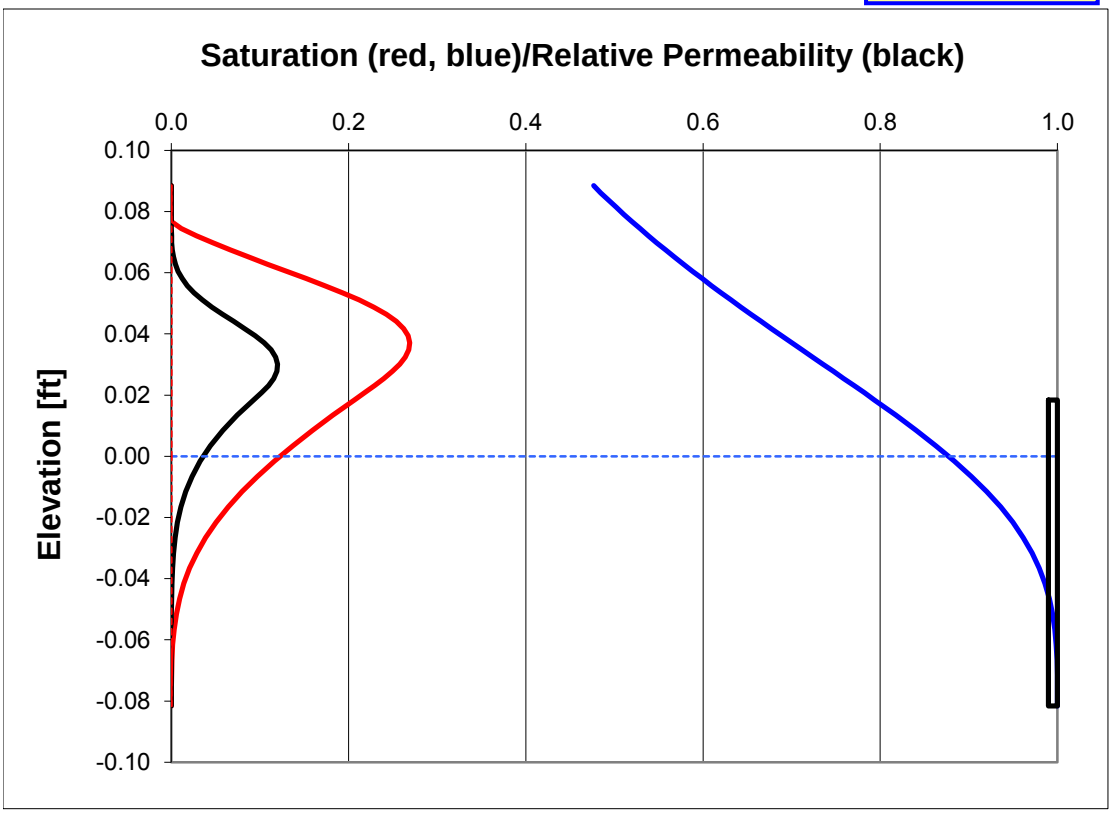


Figure F.15a
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-369
Soil Type = SW
Fluid Type = Middle Distillate

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness [feet]	
b_o =	0.030

Soil Characteristic		
n =	0.443	porosity
N =	3.260	van Genuchten "N"
α =	9.416	van Genuchten "α" [ft^{-1}]
S_{wr} =	0.114	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (vadose)
S_{ors} =	0.000	residual LNAPL saturation (saturated)

Fluid Characteristics:		
ρ_o =	0.879	LNAPL density [gm/cc]
σ_{aw} =	57.700	air/water surface tension [dyne/cm]
σ_{ao} =	28.600	air/LNAPL surface tension [dyne/cm]
σ_{ow} =	16.600	LNAPL/water surface tension [dyne/cm]

Calculated Parameters		
M =	0.693	van Genuchten "M"
α_{ao} =	16.692	air/LNAPL "α" [ft^{-1}]
α_{ow} =	3.970	LNAPL/water "α" [ft^{-1}]
z_{ao} =	0.004	elevation of air-LNAPL interface [ft]
z_{ow} =	-0.026	elevation of LNAPL-water interface [ft]
z_{max} =	0.014	maximum free-product elevation [ft]
λ =	1.428	pore-size distribution index
Ψ_b =	0.072	B-C displacement pressure head [ft]

Set *Tools* > *Option* > *Calculations* tab to "Manual."
Press Ctrl+Shift+S to calculate sheet

Figure F.15b
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-369
Soil Type = SW
Fluid Type = Middle Distillate

b_o [ft]	D_o [ft]	k_{ro}	χ [ft]	β	ξ [ft]	η		
0.000	0.000	0.000						
0.002	0.000	0.000	0.0000	0.000000	0.0000	0.000000		
0.011	0.000	0.000	0.0024	0.000007	0.0024	0.000000	0.0001	Eps-Do
0.030	0.000	0.000	0.0105	0.000232	0.0108	0.000035	0.0001	Eps-kro

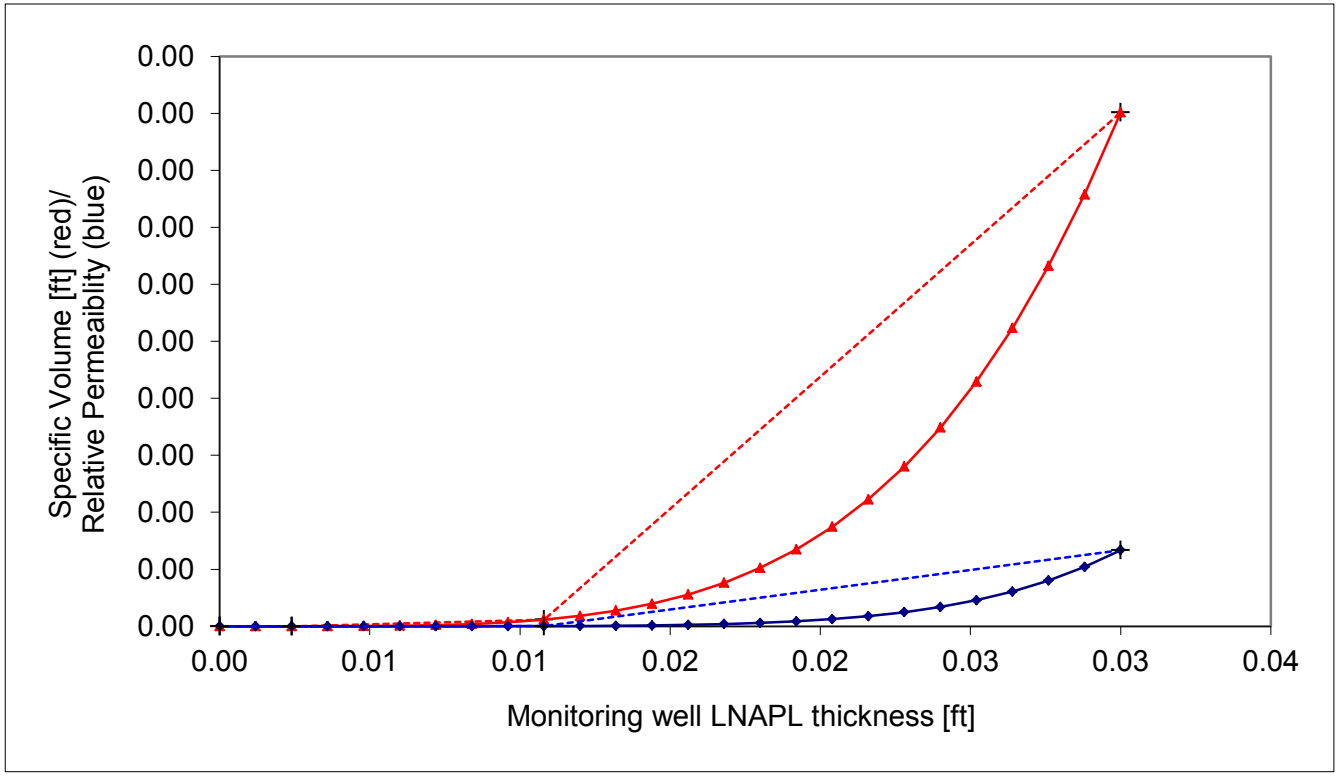


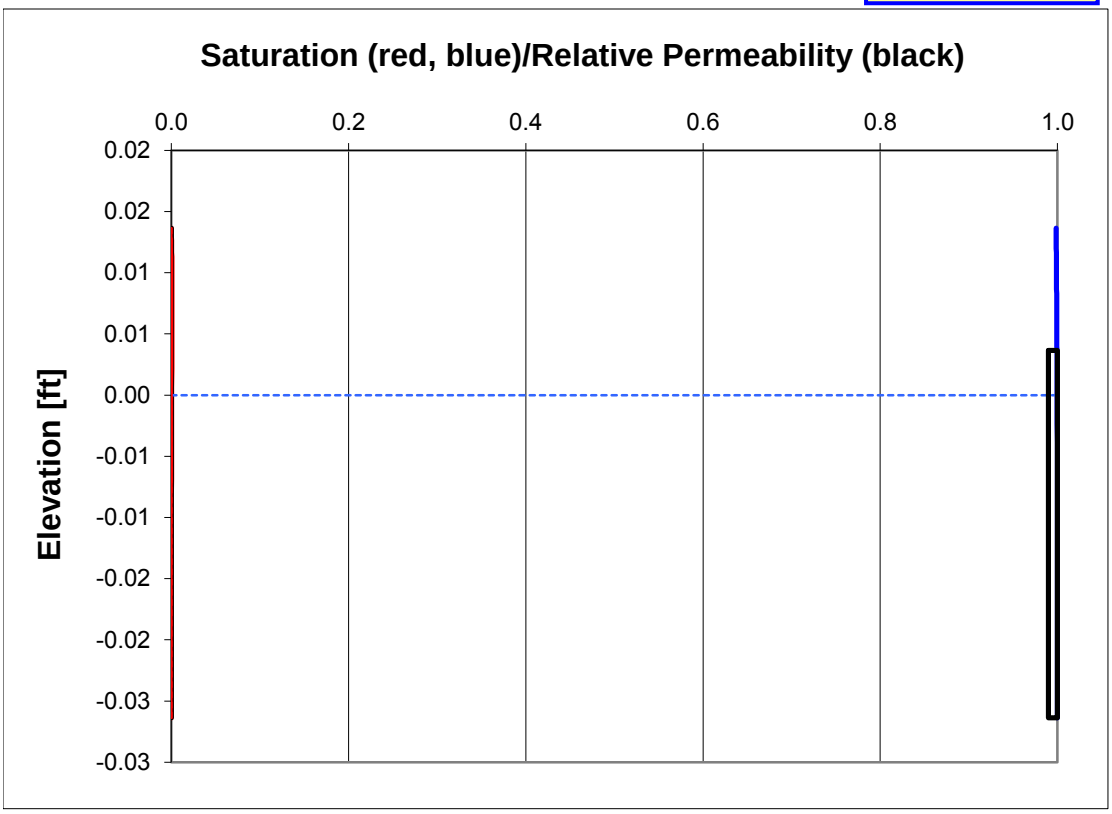
Figure F.15c
AOI 4 Site Characterization/Remedial Investigation Report
Philadelphia Energy Solutions Facility
Specific Volume Calculations
Well ID = S-369
Soil Type = SW
Fluid Type = Middle Distillate

10/7/2013

Monitoring Well LNAPL Thickness b_o [ft] =			0.030
D_o [ft] =	0.000	k_{ro} =	0.000

Enter b_o value here to plot corrsponding profiles

Press Ctrl+Shift+S to calculate sheet



APPENDIX G

Stantec Indoor Air Assessment Report

Evaluation of Specific Volatile Organic Compounds in Occupied Buildings at the former Sunoco Philadelphia Refinery

Sunoco, Inc. (R&M) Philadelphia Refinery Remediation Program

Philadelphia, Pennsylvania

Prepared for:

Sunoco, Inc. (R&M)
10 Industrial Highway MS4
Lester, Pennsylvania 19029

March 22, 2013

Project Number: 213402094

Stantec

Stantec Consulting Services Inc.
1060 Andrew Drive, Suite 140
West Chester, PA 19380
Phone: (610) 840-2540
Fax: (610) 840-2501

March 20, 2013

EVALUATION OF SPECIFIC VOLATILE ORGANIC COMPOUNDS IN OCCUPIED BUILDINGS AT THE FORMER SUNOCO PHILADELPHIA REFINERY

SUNOCO, INC. (R&M) PHILIDELPHIA
REFINERY REMEDIATION PROGRAM

Prepared For:

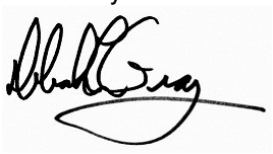
Sunoco, Inc. (R&M)
10 Industrial Highway MS4
Lester, Pennsylvania 19029

Prepared By:

Stantec Consulting Services Inc.
1060 Andrew Drive, Suite 140
West Chester, PA 19380

Project Number: 213402094

Written by:



Deborah L. Gray, Ph.D., DABT
National Director, Risk Assessment and Toxicology Practice

Reviewed by:



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Michael B. Roznowski, CHMM
Associate

Executive Summary

On Wednesday, October 24 and Thursday, October 25, 2012, Stantec Consulting Services Inc. (Stantec) conducted a comprehensive study of airborne volatile organic compounds (VOCs) in occupied buildings at the former Sunoco, Inc. (R&M) Philadelphia Refinery, now Philadelphia Energy Solutions (PES) Refining and Marketing (R&M) LLC, located at 3144 Passyunk Avenue, Philadelphia, Pennsylvania (the refinery). The study was conducted as part of Sunoco's participation in a real estate and refinery operation transaction. The study was performed to document the concentration of a number of specific chemicals which may be present inside occupied buildings from refinery activities or related refinery conditions.

Methodology

An initial site visit was conducted on September 18 and 19, 2012 by Stantec and Sunoco to select the occupied buildings to be evaluated and to determine the tentative number and locations of samples to be collected during the study. Based on the initial site visit, a sampling plan was subsequently developed which specified collection of air samples inside occupied buildings on the refinery property for analysis of petroleum-related VOCs in air utilizing United States Environmental Protection Agency (US EPA) Method TO-15 for analysis. This method calls for the collection of air samples into specially prepared vacuum SUMMA canisters (or cans). The sampling plan also specified collection of these air samples over a four (4) hour period to accommodate the possible variability in ambient VOC concentrations.

Samples were collected inside occupied areas of the selected buildings and outdoor air samples were collected for comparison. Thirty-four (34) samples were collected inside buildings and seven (7) samples outdoors. Three (3) trip blanks were also submitted for analysis. Compounds of interest for this study were consistent with the Pennsylvania Department of Environmental Protection's (PADEP) Short List of Petroleum Products, specifically: methyl tert-butyl ether (MTBE), 1,2-dichloroethane, benzene, toluene, 1,2-dibromoethane (ethylene dibromide), ethylbenzene, xylenes, isopropylbenzene (cumene), 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-trimethylbenzene (1,3,5-TMB). The concentrations of VOCs detected in each sample of indoor and outdoor air were compared to occupational exposure limits (OELs) and risk-based screening levels published by US EPA and PADEP. Summary statistics were calculated to compare the ranges of concentrations of VOCs found in indoor air to concentrations in outdoor air.

Results

The concentrations of all compounds detected in indoor and outdoor air were many orders of magnitude less than the Occupational Safety and Health Administration (OSHA) Permissible

Exposure Limit (PEL) time-weighted averages (TWAs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) TWA.

The maximum concentrations of all compounds detected in all samples were equal to (benzene only) or less than the corresponding risk-based US EPA Regional Screening Levels (RSLs) and the PADEP Indoor Air Quality (IAQ) criteria for exposure in industrial environments. Note that the US EPA RSL concentrations for chemicals with cancer health effects (MTBE, benzene, and ethylbenzene) were multiplied by a factor of ten (10) to reflect a target cancer risk of 1 in 100,000 or 1E-05 which is consistent with the Pennsylvania risk-based standards.

There were notable differences in the concentrations of most of the compounds detected inside the individual buildings that are not evident from the arithmetic means of the analytical results for all indoor air samples. Specifically, the highest concentrations of benzene were found in the Point Breeze Lab samples (11 and 8.4 µg/m^3) and the 440 Building samples (9 and 7.2 µg/m^3). The highest concentrations of toluene (88 and 330 µg/m^3), ethylbenzene (11 and 6 µg/m^3), total xylenes (51.1 and 31.6 µg/m^3) were found in the PB Lab samples (west lab and 2nd floor office, respectively). The highest concentrations of 1,3,5-TMB (3.9 µg/m^3) and 1,2,4-TMB (11 µg/m^3) were found in the PB Lab, 2nd floor office sample although the PB Lab, west lab sample was not significantly different than other indoor air sample locations.

The concentrations of benzene, toluene, ethylbenzene, xylenes, and trimethylbenzenes in buildings other than the 440 Building and the PB Lab were comparable to the concentrations in outdoor air.

Conclusions

The findings of this evaluation indicate that the indoor and outdoor concentrations of VOCs associated with refinery operations were orders of magnitude lower than occupational exposure limits, and lower than or equal to (benzene only) conservative risk-based screening levels published by US EPA and PADEP for long-term exposures in industrial settings. Note that the US EPA RSL concentrations for chemicals with cancer health effects were adjusted to be consistent with the Pennsylvania risk-based standards. Assuming that the concentrations of petroleum-related VOCs found inside the occupied buildings in late October 2012 are representative of long-term conditions, there do not appear to be health concerns for people who work inside the buildings from exposure to these chemicals.

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1.0 Introduction

Stantec Consulting Services Inc. (Stantec) conducted a comprehensive study of airborne volatile organic compounds (VOCs) in occupied buildings at the former Sunoco, Inc. (R&M) Philadelphia Refinery, now Philadelphia Energy Solutions (PES) Refining and Marketing (R&M) LLC, located at 3144 Passyunk Avenue, Philadelphia, Pennsylvania (the refinery). The study was conducted as part of Sunoco's participation in a real estate and refinery operation transaction. The study was performed to document the concentration of a number of specific chemicals that may be present inside occupied buildings from refinery activities or related refinery conditions.

During a real estate and operational transition involving a facility such as this refinery, the potential for residual chemical exposure in occupied buildings exists and it is reasonable to assess the potential adverse health risk.

This facility refines, processes, and blends transportation fuels. The chemicals of interest for this study were consistent with the Pennsylvania Department of Environmental Protection (PADEP) Table IV-9 Short List of Petroleum Products (PADEP 2004), specifically: methyl tertiary-butyl ether (MTBE), 1,2-dichloroethane, benzene, toluene, 1,2-dibromoethane (ethylene dibromide), ethylbenzene, xylenes, isopropylbenzene (cumene), 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-trimethylbenzene (1,3,5-TMB). Although the PADEP Table IV-9 Short List is for analysis of soil and water samples, all of the compounds listed for water except naphthalene, are volatile compounds of interest in air.

An initial site visit was conducted on Tuesday, September 18, and Wednesday, September 19, 2012 by Jim Oppenheim (Sunoco), Jennifer Menges (Stantec), and John Reiter (Stantec) to select the occupied buildings where sampling would be conducted and to determine the tentative number and locations of samples to be collected during the study. The sampling plan developed based on this initial site visit, and subsequently implemented by Stantec field staff in cooperation with refinery personnel in October 2012, specified collection of air samples inside occupied buildings on the refinery property for analysis of concentrations of VOCs in air by United States Environmental Protection Agency (US EPA) Method TO-15 (US EPA 1999).

US EPA Method TO-15 calls for the collection of air samples into specially prepared vacuum SUMMA canisters (or cans). The sampling plan specified collection of these air samples over a four (4) hour period of time to accommodate the possible variability in ambient VOC concentrations. Samples were collected inside occupied areas of the buildings and outside samples were collected for comparison. Thirty-four (34) samples were collected inside of buildings and seven (7) samples were collected outdoors. Three (3) trip blanks were also submitted for laboratory analysis.

Analytical results were compared to occupational exposure limits (OELs), specifically the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values

(TLVs®). Results were also compared to current (November 2012) US EPA risk-based Regional Screening Levels (RSL) for industrial occupancies and PADEP Indoor Air Quality (IAQ) criteria for industrial occupancies. Additionally, PADEP-referenced odor thresholds were cited.

2.0 Chemical Constituents and Applicable Exposure Limits

The facility is a refinery that processes and blends large quantities of petroleum-based transportation fuels. The refining and blending processes generate the volatile petroleum-based organic compounds of interest for this investigation. In addition to being flammable, these volatile compounds may cause adverse health effects ranging from upper respiratory tract irritation at lower concentrations of exposure to more severe effects such as central nervous system depression or intoxication at high concentrations of exposure. Benzene is also considered to be a human carcinogen based on epidemiologic studies demonstrating an increased risk for acute myelogenous leukemia in occupational cohorts exposed to high concentrations (e.g. exceeding approximately 10 parts per million (ppm)) over many years (ATSDR 2007). The potential for adverse health effects correlates with increasing concentrations and duration of exposure.

All of the compounds monitored in this study have relevant occupational standards and risk-based screening levels. The OELs were developed based on the precept that nearly all persons may be exposed to a concentration of the chemical at or below the exposure limit, day after day, week after week, for a working lifetime, without experiencing any adverse health effects due to the chemical exposure.

Risk-based screening levels are concentrations of chemicals in environmental media (soil, ambient air, and drinking water) that correspond to pre-determined levels of cancer risk and/or non-cancer hazard, under the assumption that an individual will be exposed daily over thirty (30) years (residential) or twenty-five (25) years working life-time. Two sources of risk-based screening concentrations are presented in this report: US EPA RSLs and PADEP IAQ criteria. All screening concentrations used to evaluate sampling results were developed for exposures in industrial settings.

The US EPA RSLs have been harmonized across US EPA Regions and are generally accepted as a quick and conservative method for initial evaluation of constituents found in environmental media. RSLs are presented by the US EPA as being protective for members of the general population (including sensitive groups) over a lifetime. Thus concentrations of chemicals in environmental media that are less than the RSLs are believed to be of no concern for public health. Concentrations of chemicals above conservative RSLs do not necessarily mean that health effects will occur as a result of exposure, but that further evaluation of the situation should be considered. There are carcinogenic target risk (TR) screening concentrations and non-carcinogenic hazard index (HI) screening concentrations. All chemicals produce non-cancer health effects at some level of exposure and some may also be carcinogenic. Screening concentrations generally (although not always) reflect the more sensitive outcome and lowest associated concentration.

Although the non-residential PADEP IAQ criteria were developed under the Pennsylvania Land Recycling Program to assist in the evaluation of vapor intrusion into non-residential buildings, these risk-based concentrations are analogous to US EPA RSLs and provide additional references for evaluating the results of the samples collected during this study.

3.0 Sampling Methodology

3.1 COLLECTION OF AMBIENT AIR SAMPLES

Ambient air samples were prepared by first checking the laboratory-provided SUMMA canister vacuum using a digital gauge and documenting the pre-sample pressure. Flow regulators with integral pressure gauges were attached to the canisters and tightened by hand. Sampling was initiated by opening the SUMMA canister valve to its fully open position.

Samples were collected at breathing zone height by placing the SUMMA canisters on elevated surfaces so that the sample collection intake ports were approximately three (3) to six (6) feet above the ground or floor surface. Samples were collected for approximately four (4) hours. While grab samples may have been sufficient, sample durations were intentionally longer to provide some assurance that if the concentration of the compound(s) were variable, the sample would be representative.

Samples were collected at indoor and outdoor locations previously selected and discussed during the initial site visit and sampling plan development. However, since sample conditions are dynamic and may have been different at the time of sample collection, the field technicians used their best judgment in sample location selection and, as a result, some locations may be different than originally planned. Three (3) trip blanks were provided to the lab for analysis.

3.2 QUALITY ASSURANCE PROCEDURES FOR SAMPLE COLLECTION

Sample quality assurance encompasses procedures used for pre-sample preparation; handling of samples before, during, and after collection; elimination of potential cross contamination; and elimination of collection of interfering compounds or materials. The need for some of these is unnecessary when using SUMMA canisters due the inherent relatively failsafe technology.

Flow rate and volume are not critical since the sample methodology is for whole air (i.e., a prescribed total volume) regardless of the rate of sampling or total volume of air collected. The flow regulators provide an approximate canister fill time. Following sample completion the final pressure is recorded for assurance that air was indeed collected into the canister.

Contemporary sampling media provides little opportunity for cross-contamination or external contamination. SUMMA canisters were cleaned and prepared by the analytical laboratory in a manner consistent and appropriate for re-use and the methodology and compounds selected for analysis.

Onsite recordkeeping included SUMMA can serial number, flow controller serial number, start time, stop time, total sample time, location of sample, pre-sample pressure, post-sample pressure, and notes pertaining to the location of the sample. This information is provided in Table 1.

The laboratory received the samples according to their strict receipt requirements and documentation. A *Sample Acceptance Check Form* is provided with the laboratory analytical reports provided in Appendix A.

4.0 Sampling Locations

Figure 1 illustrates the locations of buildings in which samples were collected and outside sample locations. The indoor sample locations were selected during the initial site visit by Jim Oppenheim (Sunoco), Jennifer Menges (Stantec), and John Reiter (Stantec). The indoor sample locations were selected based on the current and anticipated occupancy and use of the buildings, populations in the buildings, and locations of occupants within the buildings. The number and locations of indoor air samples per building were selected to be representative of conditions and potential exposure to the building occupants. Outdoor sample locations were selected based on the proximity to buildings in which samples were collected, and in some instances, proximity to pumping and product handling equipment. The number and locations of outdoor air samples were selected to be representative of petroleum-related compounds in ambient air that may contribute to the presence of the same compounds in indoor air.

Samples were collected in building locations identified in Table 1 and shown on Figure 1. Indoor air samples were collected in the following locations:

- Blending & Shipping (B&S) Office
- 24 Gate Building
- Girard Point (GP) Training Building
- GP Main Office Building
- 440 Building
- 15 Pump House
- North Yard Scale House
- Schuylkill River Tank Farm (SRTF) Propane Loading
- SRTF Main Pump House
- Point Breeze (PB) Main Office Building
- PB Lab
- PB Refinery Hall
- PB Maintenance Shop

Duplicate samples were collected in the 24 Gate Building (1st floor), the GP Main Office Building (2nd floor east), and the PB Refinery Hall (2nd floor east wing).

Outdoor samples were collected in the following locations:

- near the B&S Office
- outside the GP Main Office Building
- outside 15 Pump House, under the equipment roof at grade
- outside 15 Pump House, under the equipment roof approximately eight (8) to ten (10) feet below grade
- outside the North Yard Scale House
- outside the SRTF Main Pump House
- outside in the PB gate area, near the PB buildings

5.0 Analytical Results

Table 1 lists the sample location, date of sampling, start time, stop time, total sample duration, canister ID, regulator ID, pre-sample pressure, and post-sample pressure. Table 2 presents the analytical results for each indoor and outdoor sample location. Summary statistics for indoor and outdoor air samples are presented in Table 3 along with occupational exposure standards and risk-based screening concentrations. Laboratory analytical reports are provided in Appendix A.

The table below presents the arithmetic mean for all compounds detected in two (2) or more samples, or the only concentration detected. The maximum detected concentrations are shown below the means in bold, italic font. Two (2) of the compounds of interest, 1,2-dichloroethane and 1,2-dibromoethane were not detected in any of the samples and are not included on this summary table. The three (3) duplicate samples corresponding to sample numbers 3, 15, and 40 on Table 2 yielded analytical results that were virtually identical to the results of the corresponding "sample" and are not factored into the summary statistics.

Summary of Air Sampling Results [1)]

Compound	OSHA PEL [2)]	ACGIH TLV [3)]	RSL Ind. [4)]	PADEP Ind. [5)]	Indoor		Outdoor	
					Freq. Detect	Concentration (mean / ***max***)	Freq. Detect	Concentration (mean / ***max***)
MTBE [6)]	—	1.8E+05	4.7E+02	3.1E+02	2/34	1.28E+00 ***1.6E+00***	0/7	—
Benzene	3.19E+03	1.6E+03	1.6E+01	1.1E+01	34/34	2.9E+00 ***1.1E+01***	6/7	2.62E+00 ***4.9E+00***
Ethylbenzene	4.34E+05	8.68E+04	4.90E+01	7.30E+01	30/34	1.77E+00 ***1.1E+01***	2/7	1.97E+00 ***3.1E+00***
Toluene	7.54E+05	7.54E+05	2.20E+04	1.20E+03	34/34	1.88E+01 ***3.3E+02***	7/7	7.61E+00 ***1.9E+01***
Xylenes	4.34E+05	4.34E+05	4.40E+02	3.00E+02	34/34	7.50E+00 ***5.11E+01***	5/7	6.55E+00 ***1.71E+01***
Cumene	2.46E+05	2.46E+05	1.80E+03	1.10E+03	17/34	1.42E+00 ***2.6E+00***	1/7	2.0E+00 ***2.0E+00***
1,3,5-TMB [7)]	—	1.23E+05	3.10E+01	1.70E+01	7/34	1.53E+00 ***3.9E+00***	1/7	1.6E+00 ***1.6E+00***
1,2,4-TMB [8)]	—	1.23E+05	3.10E+01	1.70E+01	31/34	1.96E+00 ***1.1E+01***	4/7	1.69E+00 ***3.6E+00***

Footnotes:

1) All concentrations, including those for occupational standards are given in µg/m^3
2) OSHA Permissible Exposure Limit (PEL)
3) ACGIH Threshold Limit Value (TLV)
4) EPA Regional Screening Level (RSL) for industrial exposure
5) Pennsylvania Department of Environmental Protection IAQ criteria for industrial exposure
6) methyl tert-butyl ether
7) 1,3,5-trimethylbenzene (RSL for 1,2,4-trimethylbenzene)
8) 1,2,4-trimethylbenzene

The analytical results are discussed in the following sections with concentrations provided in micrograms per cubic meter (µg/m^3).

5.1 COMPARISON OF INDOOR AIR SAMPLES

5.1.1 Indoor Air Samples

Of the ten (10) compounds analyzed (m,p-xylenes and o-xylene were combined into total xylenes), 1,2-dichloroethane and 1,2-dibromoethane were not detected in any sample and MTBE was detected only in two (2) samples, both on the second floor of the PB Refinery Hall. Benzene, toluene, and xylene were detected in the majority of the indoor and outdoor samples. No compounds were detected in the trip blanks.

There were notable differences in the concentrations of most of the compounds detected inside the individual buildings that are not evident from the arithmetic means of the analytical results for all indoor air samples. Specifically, the highest concentrations of benzene were found in the PB Lab samples (11 and 8.4 µg/m^3) and the 440 Building samples (9 and 7.2 µg/m^3). The highest concentrations of toluene (88 and 330 µg/m^3), ethylbenzene (11 and 6 µg/m^3), total xylenes (51.1 and 31.6 µg/m^3) were found in the PB Lab samples (west lab and 2nd floor office, respectively). The highest concentrations of 1,3,5-TMB (3.9 µg/m^3) and 1,2,4-TMB (11 µg/m^3) were found in the PB Lab, 2nd floor office sample although the PB Lab, west lab sample was not significantly different than other indoor air sample locations.

MTBE was detected only in samples collected in the PB Refinery Hall building (2nd floor, both conference room and east wing) and was undetected in any other inside or outside sample.

The concentrations of benzene, toluene, ethylbenzene, xylenes, and trimethylbenzenes in buildings other than the 440 Building and the PB Lab were similar to the concentrations in outdoor air. As shown in the table below, the range of concentrations detected in air samples from the 440 Building and the PB Lab are compared to the range of concentrations found in all of the other buildings (as a group; not including non-detects) from which samples were collected.

Range of Concentrations Detected in Indoor Air by Building [1)]

Compound	440 Building		PB Lab		All Other Buildings		Outdoor	
	low	high	low	high	low	high	low	high
MTBE [2)]	—	—	—	—	0.96	1.6	—	—
Benzene	7.2	9.0	8.4	11	0.94	4.3	1.2	4.9
Ethylbenzene	0.97	1.8	6.0	11	0.74	2.9	0.83	3.1
Toluene	8.2	8.3	88	330	3.6	14	2.0	19
Xylenes	4.4	5.8	31.6	51.1	2.5	14.7	2.0	17.1
Cumene	1.9	2.5	1.3	2.6	0.77	2.1	2.0	2.0
1,3,5-TMB [3)]	—	—	1.4	3.9	0.87	1.3	1.6	1.6
1,2,4-TMB [4)]	1.2	1.3	3.9	11	0.78	4.0	0.92	3.6

Footnotes:
1) All concentrations are given in µg/m^3
2) methyl tert-butyl ether
3) 1,3,5-trimethylbenzene
4) 1,2,4-trimethylbenzene

It is apparent that the concentrations of VOCs found indoors on the second floor of the PB Lab were higher than in the other buildings and higher than outdoor air. In particular, the lowest concentrations of ethylbenzene, toluene, and total xylenes detected in the PB Lab were higher than the highest concentrations of those same compounds found in all other buildings combined. These results indicate that sources in the PB Lab were likely contributing to the concentrations of VOCs in this space.

5.1.2 Outdoor Ambient Air Samples

From the discussion above, it can be seen that the range of VOC concentrations detected in samples of outdoor air overlap the range of the same compounds detected in air from all of the buildings except for the PB Lab. While benzene, toluene, xylenes, and 1,2,4-TMB were found in more than 50% of the outdoor air samples as shown in Table 3, MTBE, cumene, and 1,3,5-TMB were less prevalent in outdoor air than in indoor air.

With the exceptions of the 440 Building and the PB Lab noted previously, the range of concentrations of VOCs were similar in indoor and outdoor air.

6.0 Comparison of Inside Samples to Applicable Exposure Limits

6.1 OCCUPATIONAL EXPOSURE LIMITS

OELs published as OSHA PELs and ACGIH TLVs® are presented in Table 3 for all constituents for which these were available. ACGIH TLVs are health-based values and refer to concentrations of chemicals to which it is believed nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects. The majority of OSHA PELs are based on 1969 TLVs with the exception that some have been updated as chemical-specific standards to reflect more current toxicological data and research (e.g., benzene).

As shown by Table 3, the concentrations of all detected compounds inside the buildings and in outdoor air samples are more than 100 times lower than the lowest OEL (benzene).

6.2 RISK-BASED SCREENING LEVELS

US EPA RSLs and PADEP IAQ criteria concentrations for exposure to constituents in air in industrial settings are presented on Table 3 and discussed briefly below.

6.2.1 US EPA RSLs

US EPA RSLs for carcinogenic chemicals are derived to correspond to an excess lifetime cancer risk of 1 in 1,000,000 (1 in 1 million or 1E-06) for a person (receptor) who is assumed to be exposed to that concentration over an extended period of time (twenty-five (25) years for industrial). The RSL concentrations for cancer health effects (MTBE, benzene, and ethylbenzene) were multiplied by a factor of 10 to correspond to the Pennsylvania target risk of 1 in 100,000 (1 in one hundred thousand or 1E-05). To put the conservatism of the risk-based screening levels for cancer health effects into perspective, between 1 in 4 and 1 in 3 people in the United States develop some type of cancer during their lifetime.

RSLs for chemicals that produce adverse non-cancer effects are concentrations that are very unlikely to produce health effects in people who are exposed over many years. Concentrations of constituents below applicable RSL concentrations are generally not considered to be of concern for public health. Concentrations above RSLs do not necessarily mean that adverse health effects will occur, but do indicate that additional evaluation may be appropriate. All RSL concentrations for non-cancer health effects (toluene, all xylene isomers, cumene and both trimethylbenzene isomers) correspond to a Hazard Quotient (HQ) of 1.0. The HQ is the ratio of the potential exposure to the chemical on a daily basis to the level of exposure at which no non-cancer adverse health effects would be expected to occur. Like the risk-based screening levels for cancer as a health outcome, screening levels for non-cancer health effects are also extremely conservative (protective). No adjustments to non-cancer screening level concentrations were required because both the EPA RSLs and PADEP IAQ criteria were derived to correspond to HQ of 1.0.

6.2.2 PADEP Indoor Air Quality Criteria

Similar to the US EPA RSLs, the PADEP IAQ criteria for evaluating vapor intrusion into non-residential buildings are derived using risk-based algorithms. The concentrations correspond to a target cancer risk of 1E-05 and HQ of 1.0. These values were developed as guidelines for remediation and were published in the Land Recycling Program Technical Guidance Manual (January 24, 2004). For the majority of the compounds found in this investigation, the US EPA RSLs and PADEP IAQ criteria values are similar. The most notable exception is toluene, where the EPA RSL is approximately ten (10) times higher than the PADEP IAQ criteria. It should also be noted that the PADEP criteria were published in 2004 and the EPA RSLs are current as of November 2012.

The PADEP odor thresholds are also shown on Table 3. None of the petroleum-related compounds selected for analysis in indoor or outdoor samples were detected in concentrations approaching or exceeding these published odor thresholds.

6.2.3 Comparison of Results to Risk-Based Screening Levels

As can be seen from Table 3, none of the concentrations of VOCs detected in either samples of indoor air or outdoor air were higher than the corresponding risk-based screening levels for long-term exposure in an industrial setting. The highest concentration of benzene found in the second floor of the PB Lab (11 µg/m^3) was equal to the PADEP industrial (non-residential) IAQ criteria, but slightly less than the current (November 2012) EPA RSL (16 µg/m^3) adjusted to a cancer risk of 1E-05.

7.0 Summary and Conclusions

With the exception of the concentrations of all chemicals found in the air of the PB Lab, and for benzene in the 440 Building, the average indoor concentrations of VOCs were similar to the average outdoor concentrations.

The concentrations of all chemicals detected in indoor and outdoor air were several orders of magnitude less than the OSHA PEL TWAs and the ACGIH TLV® TWAs. No concentration of any chemical remotely approached the corresponding odor threshold listed by PADEP.

The maximum concentrations of all chemicals detected in all samples were equal to (benzene in the PB Lab) or less than the corresponding conservative risk-based US EPA RSL and the PADEP IAQ criteria for exposure in industrial environments. Note that the US EPA RSL concentrations for chemicals with cancer health effects (MTBE, benzene, and ethylbenzene) were multiplied by a factor of ten (10) to reflect a target cancer risk of 1 in 100,000 or 1E-05 which is consistent with the Pennsylvania risk-based standards. US EPA RSLs are derived to correspond to a target cancer risk of 1 in 1,000,000 or 1E-06. Non-cancer screening criteria (toluene, xylenes, 1,3,5-TMB and 1,2,4-TMB) correspond to a HQ of 1.0.

In general, the concentrations of petroleum-related VOCs found in the air inside and outside of the buildings were low, considering that the facility is a petroleum refinery. The concentrations of individual VOCs found during this investigation can be put into perspective by comparing the results to regional ambient air concentrations reported by PADEP.

Regional ambient air quality in the Philadelphia area where the refinery is located is best represented by data from the Marcus Hook monitoring station (latitude 39.8178, longitude -75.4142). The table below shows the arithmetic mean indoor and outdoor concentrations of benzene, toluene, ethylbenzene, xylenes (m-, p- isomers), 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene documented at the facility alongside regional outdoor air concentrations from the Marcus Hook monitoring station (PADEP 2003).

Comparison of Concentrations Detected to Regional Air [1)]

Compound	*Facility Results [2)]*		*Marcus Hook [3)]*
	Indoors	*Outdoors*	
Benzene	2.9 (±2.45)	2.62 (±1.48)	2.84
Ethylbenzene	1.77 (±1.99)	1.97 (±1.61)	0.91
Toluene	18.77 (±56.76)	7.61 (±5.65)	5.46
Xylenes (m,p)	5.67 (±7.44)	4.86 (±4.59)	2.91
1,3,5-TMB [4)]	1.53 (±1.06)	1.6	0.34
1,2,4-TMB [5)]	1.96 (±1.91)	1.69 (±1.29)	0.88

Footnotes:

1) All concentrations are given in µg/m^3
2) *Mean (Standard Deviation)* values from Table 3
3) From PADEP 2003
4) 1,3,5-trimethylbenzene
5) 1,2,4-trimethylbenzene

As would be expected, the concentrations of petroleum-related compounds in the outdoor air at the facility were somewhat higher than regional background. However, the average concentrations of benzene in both indoor and outdoor air at the facility were similar to the annual average concentration reported for the Marcus Hook monitoring station in 2000 (PADEP 2003). As discussed previously, the arithmetic mean of the toluene concentrations from all of the indoor air samples is highly influenced by the concentrations detected in the PB Lab.

In conclusion, the findings of this study show that the concentrations of volatile organic compounds associated with refinery operations found in indoor and outdoor air were orders of magnitude lower than occupational exposure standards, and lower than or equal to (benzene only) conservative risk-based screening levels published by US EPA and PADEP for long-term exposures in industrial (non-residential) settings. The concentrations of petroleum-related compounds detected in the air inside occupied buildings on the former Sunoco Philadelphia Refinery are not anticipated to pose an adverse health risk for persons working in those buildings.

8.0 References

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Code of Federal Regulations Chapter 29 Part 1910, Occupational Safety and Health Standards, Subpart Z – Toxic and Hazardous Substances, Table Z-1 Limits for Air Contaminants. (http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

US EPA Regional Screening Levels Table, November 2012.

US EPA, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition. Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/ Mass Spectrometry (GC/MS). January 1999.

FIGURE



SOURCE: BASEMAP PROVIDED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES

N

LEGEND

- OUTDOOR AIR SAMPLING LOCATION
- AREA OF INTEREST
- BUILDING LOCATION FOR INDOOR AIR SAMPLING

FIGURE 1

SITE PLAN

FOR SUNOCO

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

0 250 500 FEET

SCALE: AS SHOWN
DATE: 8/29/2013
DRN: TFB
CHD: JLM

TABLES

Table 1: Sample Locations and Parameters - Sunoco Philadelphia Refinery									
Sample No.	**Location/Description**	**Date**	**Start Time**	**Stop Time**	**Sample Duration (hr:min)**	**Canister ID**	**Regulator ID**	**Pre-Sample Pressure, (PSI) [1]**	**Post-Sample Pressure, (PSI) [1]**
1	B&S Office	10/24/2012	10:35	14:35	4:00	AC01003	FCA00317	29.5	8.0
2	B&S Office (outside)	10/24/2012	10:37	14:39	4:02	AC00760	FCA00595	29.5	13.0
3	24 Gate Building (1st floor)	10/24/2012	10:50	14:50	4:00	AC01853	FCA00134	29.5	7.0
4	24 Gate Building (2nd floor)	10/24/2012	10:52	14:52	4:00	AC01010	FCA00188	29.6	7.3
5	GP Training Building (1st floor vending area)	10/24/2012	11:07	15:07	4:00	AC01928	FCA00161	29.5	9.0
6	GP Training Building (1st floor west)	10/24/2012	11:10	15:10	4:00	AC01669	FCA00564	29.5	9.0
7	GP Training Building (3rd floor gym)	10/24/2012	11:12	15:13	4:01	AC00641	FCA00023	29.5	6.5
8	GP Training Building (basement)	10/24/2012	11:10	15:16	4:06	AC00747	FCA00604	29.5	7.5
9	GP Main Office Building (basement west)	10/24/2012	12:26	16:26	4:00	AC01113	FCA00575	29.5	7.0
10	GP Main Office Building (basement center)	10/24/2012	12:31	16:31	4:00	AC01436	FCA00521	29.4	10.0
11	GP Main Office Building (basement east)	10/24/2012	12:33	16:33	4:00	AC01376	FCA00349	29.4	8.0
12	GP Main Office Building (1st floor entrance)	10/24/2012	12:36	16:37	4:01	AC00672	FCA00198	29.4	4.8
13	GP Main Office Building (1st floor west)	10/24/2012	12:48	16:48	4:00	AC00475	FCA00402	29.5	3.5
14	GP Main Office Building (2nd floor west)	10/24/2012	12:54	16:54	4:00	AC01263	FCA00516	29.4	9.5
15	GP Main Office Building (2nd floor east)	10/24/2012	12:40	16:40	4:00	AC01145	FCA00374	29.4	6.5
16	GP Main Office Building (outside west)	10/24/2012	12:44	16:44	4:00	AC00782	FCA00298	29.6	0.0
17	440 Building (2nd floor Room 221, inspection)	10/24/2012	13:10	17:10	4:00	AC01215	FCA00365	29.5	8.0
18	440 Building (2nd floor meeting room)	10/24/2012	13:13	17:13	4:00	AC01670	FCA00319	29.6	5.5
19	15 Pump House (inside)	10/24/2012	13:27	17:27	4:00	AC01930	FCA00016	29.5	7.0
20	15 Pump House (under roof w/ pump equipment, approximately 8-10' below grade)	10/24/2012	13:30	17:30	4:00	AC01420	FCA00397	29.5	6.3
21	15 Pump House (outside, at grade)	10/24/2012	13:35	17:35	4:00	AC01464	FCA00034	29.5	3.0
22	North Yard Scale House (inside)	10/24/2012	13:51	17:51	4:00	AC00590	FCA00168	29.5	7.8
23	North Yard Scale House (outside)	10/25/2012	8:17	12:18	4:01	AC01664	FCA00422	29.0	11.0
24	“Trip blank,” regulator attached, unopened	10/25/2012	---	---	---	AC01830	FCA00480	29.4	29.4

Table 1: Sample Locations and Parameters - Sunoco Philadelphia Refinery

Sample No.	Location/Description	Date	Start Time	Stop Time	Sample Duration (hr:min)	Canister ID	Regulator ID	Pre-Sample Pressure, (PSI) [1]	Post-Sample Pressure, (PSI) [1]
25	"Trip blank," regulator attached, unopened	10/25/2012	---	---	---	AC01093	FCA00058	29.5	29.5
26	SRTF Propane Loading (inside)	10/25/2012	8:59	12:59	4:00	AC00540	FCA00482	29.3	8.5
27	SRTF Main Pump House (inside)	10/25/2012	9:07	13:08	4:01	AC01810	FCA00609	29.4	8.0
28	SRTF Main Pump House (outside)	10/25/2012	9:10	13:10	4:00	AC01350	FCA00454	29.5	5.0
29	PB Main Office Building, (safety office)	10/25/2012	8:23	12:23	4:00	AC00716	FCA00239	29.5	0.0
30	PB Main Office Building, (medical area)	10/25/2012	8:29	12:29	4:00	AC00501	FCA00015	29.5	6.0
31	PB Main Office Building, (1st floor lobby)	10/25/2012	8:34	12:34	4:00	AC00765	FCA00303	29.5	5.8
32	PB Main Office Building,(1st floor east wing)	10/25/2012	8:37	12:37	4:00	AC01403	FCA00432	29.5	10.0
33	PB Main Office Building, (1st floor west wing)	10/25/2012	8:41	12:41	4:00	AC01573	FCA00449	29.5	3.0
34	PB Main Office Building, (2nd floor west wing)	10/25/2012	8:44	12:44	4:00	AC00947	FCA00632	29.5	5.0
35	PB Main Office Building, (2nd floor center file room)	10/25/2012	8:48	12:48	4:00	AC00033	FCA00473	29.5	4.0
36	PB Main Office Building, (2nd floor east conference room)	10/25/2012	8:51	12:51	4:00	AC01790	FCA00538	29.5	3.5
37	PB Lab (west lab)	10/25/2012	9:00	13:00	4:00	AC01886	FCA00274	29.5	5.0
38	PB Lab (2nd floor office)	10/25/2012	9:08	13:08	4:00	AC01487	FCA00418	29.5	4.5
39	PB Refinery Hall (2nd floor conference room)	10/25/2012	9:40	13:40	4:00	AC01115	FCA00563	29.6	6.5
40	PB Refinery Hall (2nd floor east wing)	10/25/2012	9:43	13:43	4:00	AC01243	FCA00603	29.4	2.0
41	PB Maintenance Shop (break room)	10/25/2012	9:51	13:51	4:00	AC01218	FCA00405	29.6	9.0
42	PB Maintenance Shop (office)	10/25/2012	9:55	13:55	4:00	AC01179	FCA00040	29.6	4.8
43	PB buildings (adjacent gate area)	10/25/2012	10:00	14:00	4:00	AC00870	FCA00215	29.5	6.0
44	"Trip blank," regulator attached, unopened	10/25/2012	---	---	---	AC00993	FCA00619	29.5	29.5

1. PSI = pounds per square inch

Table 2: Laboratory Analytical Results – Select Volatile Organic Compounds (VOCs) - Sunoco Philadelphia Refinery [1,2,3]

Sample	Type[4]	Location/Description	Methyl Tertiary Butyl Ether (MTBE)	1,2-dichloroethane	Benzene	Toluene	1,2 Dibromoethane	Ethylbenzene	m,p-Xylene	o-Xylene	total Xylene	Cumene	1,3,5-Trimethyl benzene	1,2,4-Trimethyl benzene
1	I	B&S Office	ND[5]	ND	4.3	7.4	ND	1.3	4.5	1.6	6.1	2.1	ND	1.5
3	I	24 Gate Building (1st floor)	ND	ND	2.1	7.0	ND	1.5	4.0	1.5	5.5	1.0	ND	1.7
4	I	24 Gate Building (2nd floor)	ND	ND	1.8	6.8	ND	1.2	3.8	1.4	5.2	ND	ND	1.5
5	I	GP Training Building (1st floor vending area)	ND	ND	3.5	7.2	ND	1.3	3.7	1.4	5.1	1.0	ND	1.6
6	I	GP Training Building (1st floor west)	ND	ND	4.2	7.5	ND	2.2	4.6	1.7	6.3	1.3	ND	1.8
7	I	GP Training Building (3rd floor gym)	ND	ND	4.2	12	ND	1.8	6.3	2.2	8.5	2.0	1.2	4.0
8	I	GP Training Building (basement)	ND	ND	3.1	7.8	ND	1.5	4.9	1.8	6.7	1.5	0.97	3.2
9	I	GP Main Office Building (basement west)	ND	ND	2.3	6.9	ND	1.3	4.2	1.5	5.7	1.4	ND	1.6
10	I	GP Main Office Building (basement center)	ND	ND	2.2	6.9	ND	1.2	3.6	1.3	4.9	1.0	ND	1.3
11	I	GP Main Office Building (basement east)	ND	ND	1.6	6.1	ND	0.86	2.7	1.0	3.7	ND	ND	0.93
12	I	GP Main Office Building (1st floor entrance)	ND	ND	1.7	6.2	ND	0.99	2.9	1.1	4.0	ND	ND	1.0
13	I	GP Main Office Building (1st floor west)	ND	ND	1.5	5.6	ND	0.86	2.6	0.96	3.56	ND	ND	ND
14	I	GP Main Office Building (2nd floor west)	ND	ND	1.6	6	ND	1.1	3.0	1.1	4.1	0.79	ND	1.0
15	I	GP Main Office Building (2nd floor east)	ND	ND	1.9	6.4	ND	1.2	3.4	1.2	4.6	1.0	ND	1.2
17	I	440 Building (2nd floor Room 221, inspection)	ND	ND	9.0	8.3	ND	1.8	4.3	1.5	5.8	2.5	ND	1.3
18	I	440 Building (2nd floor meeting room)	ND	ND	7.2	8.2	ND	0.97	3.2	1.2	4.4	1.9	ND	1.2
19	I	15 Pump House (inside)	ND	ND	3.6	14	ND	2.9	11	3.7	14.7	0.77	1.3	3.3
22	I	North Yard Scale House (inside)	ND	ND	1.7	9.2	ND	1.7	4.6	1.5	6.1	0.85	ND	1.2
26	I	SRTF Propane Loading (inside)	ND	ND	2.1	4.0	ND	0.99	3.8	1.3	5.1	1.1	ND	1.4
27	I	SRTF Main Pump House (inside)	ND	ND	2.3	3.6	ND	ND	3	1.1	4.1	ND	ND	ND
29	I	PB Main Office Building, (safety office)	ND	ND	1.6	6.5	ND	0.95	3.3	1.1	4.4	ND	ND	0.99
30	I	PB Main Office Building, (medical area)	ND	ND	1.2	4.4	ND	ND	2.3	0.87	3.17	ND	ND	1.1
31	I	PB Main Office Building, (1st floor lobby)	ND	ND	1.3	4.8	ND	ND	2.5	0.91	3.41	ND	ND	0.94
32	I	PB Main Office Building,(1st floor east wing)	ND	ND	1.3	5.2	ND	ND	2.5	ND	2.5	ND	ND	ND
33	I	PB Main Office Building, (1st floor west wing)	ND	ND	1.4	5	ND	0.93	3.5	1.1	4.6	ND	ND	0.97
34	I	PB Main Office Building, (2nd floor west wing)	ND	ND	1.3	4.9	ND	0.89	3.3	1.3	4.6	ND	ND	1.1

Table 2: Laboratory Analytical Results – Select Volatile Organic Compounds (VOCs) - Sunoco Philadelphia Refinery [1,2,3]

Sample	Type[4]	Location/Description	Methyl Tertiary Butyl Ether (MTBE)	1,2-dichloroethane	Benzene	Toluene	1,2 Dibromoethane	Ethylbenzene	m,p-Xylene	o-Xylene	total Xylene	Cumene	1,3,5-Trimethyl benzene	1,2,4-Trimethyl benzene
35	I	PB Main Office Building, (2nd floor center file room)	ND	ND	1.2	5.9	ND	1.0	3.7	1.4	5.1	ND	ND	0.95
36	I	PB Main Office Building, (2nd floor east conf. room)	ND	ND	0.94	4.0	ND	0.74	2.5	0.97	3.47	ND	ND	0.78
37	I	PB Lab (west lab)	ND	ND	11	88	ND	11	42	9.1	51.1	1.3	1.4	3.9
38	I	PB Lab (2nd floor office)	ND	ND	8.4	330	ND	6.0	24	7.6	31.6	2.6	3.9	11
39	I	PB Refinery Hall (2nd floor conference room)	0.96	ND	1.4	6.4	ND	1.1	3.9	1.4	5.3	ND	ND	1.1
40	I	PB Refinery Hall (2nd floor east wing)	1.6	ND	2.0	8.8	ND	1.4	5.4	1.8	7.2	ND	ND	1.5
41	I	PB Maintenance Shop (break room)	ND	ND	1.8	9.0	ND	1.3	5.2	1.9	7.1	ND	1.1	3.1
42	I	PB Maintenance Shop (office)	ND	ND	1.7	8.2	ND	1.1	4.6	1.7	6.3	ND	0.87	2.5
2	O	B&S Office (outside)	ND	ND	3.9	6.5	ND	ND	3.7	1.4	5.1	2.0	ND	1.3
16	O	GP Main Office Building (outside west)	ND	ND	1.3	4.6	ND	ND	2.0	ND	2.0	ND	ND	ND
20	O	15 Pump House (under roof w/ pump equipment, approximately 8-10' below grade)	ND	ND	2.1	7.4	ND	0.83	2.8	1.1	3.9	ND	ND	0.92
21	O	15 Pump House (outside, at grade)	ND	ND	4.9	19	ND	3.1	13	4.1	17.1	ND	1.6	3.6
23	O	North Yard Scale House (outside)	ND	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	ND
28	O	SRTF Main Pump House (outside)	ND	ND	2.3	2	ND	ND	ND	ND	ND	ND	ND	ND
43	O	PB buildings (adjacent gate area)	ND	ND	1.2	10	ND	ND	2.8	0.99	3.79	ND	ND	0.93
24	TB	"Trip blank" - not opened	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	TB	"Trip blank" - not opened	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
44	TB	"Trip blank" - not opened	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

1. All units are in micrograms per cubic meter of air (ug/m^3) by volume
2. All samples were analyzed utilizing EPA Method TO-15.
3. Copies of Laboratory Analytical Results are provided as Appendix A.
4. "I"=Indoor air sample; "O"=Outdoor air sample; "TB"= Trip Blank, SUMMA canisters which were not opened, used for QA/QC.
5. "ND"=Non-Detect

Table 3: Summary Statistics – Select Volatile Organic Compounds (VOCs) - Sunoco Philadelphia Refinery [1,2,3]

Analytes		Methyl Tertiary Butyl Ether (MTBE)	1,2-dichloroethane	Benzene	Toluene	1,2 Dibromoethane	Ethyl benzene	mp-Xylene	o-Xylene	total Xylene	Cumene	1,3,5-Trimethyl benzene	1,2,4-Trimethyl benzene
Health Effects [4,5]		c	c	c	nc	c	c	nc	nc	nc	nc	nc	nc
Occupational and Risk-Based Screening Criteria													
OSHA PELs [6]		--	2.02E+05	3.19E+03	7.54E+05	1.54E+05	4.34E+05	4.34E+05	4.34E+05	4.34E+05	2.46E+05	--	--
ACGIH TLVs® [6]		1.80E+05	4.05E+04	1.60E+03	7.54E+04	--	8.68E+04	4.34E+05	4.34E+05	4.34E+05	2.46E+05	1.23E+05	1.23E+05
EPA RSLs Industrial[7]		4.70E+02	7.70E+01	1.60E+01	2.20E+04	2.00E-01	4.90E+01	4.40E+02	4.40E+02	4.40E+02	1.80E+03	3.10E+01	3.10E+01
PADEP IAQ Industrial [8]		3.10E+02	3.10E+00	1.10E+01	1.20E+03	3.70E-01	7.30E+01	3.00E+02	3.00E+02	3.00E+02	1.10E+03	1.70E+01	1.70E+01
PADEP Odor		1.90E+02	2.40E+04	2.70E+03	6.40E+02	1.92E+05	6.08E+05	2.00E+03	2.00E+03	2.00E+03	6.00E+01	--	--
Summary Statistics for Indoor Samples													
Indoor	Number - total	34	34	34	34	34	34	34	34	34	34	34	34
	Non-Detects	32	34	0	0	34	4	0	1	0	17	27	3
	Detects	2	0	34	34	0	30	34	33	34	17	7	31
	Minimum	0.96	--	0.94	3.6	--	0.74	2.3	0.87	3.17	0.77	0.87	0.78
	Maximum	1.6	--	11	330	--	11	42	9.1	51.1	2.6	3.9	11
	Median	1.28	--	1.85	6.85	--	1.2	3.75	1.4	5.1	1.3	1.2	1.3
	Mean	1.28	--	2.90	18.77	--	1.77	5.67	1.85	7.50	1.42	1.53	1.96
	Std. Deviation	0.45	--	2.45	56.76	--	1.99	7.44	1.76	9.15	0.59	1.06	1.91
Summary Statistics for Outdoor Samples													
Outdoor	Number - total	7	7	7	7	7	7	7	7	7	7	7	7
	Non-Detects	7	7	1	0	7	5	2	3	2	6	6	3
	Detects	0	0	6	7	0	2	5	4	5	1	1	4
	Minimum	.	.	1.2	2	.	0.83	2	0.99	2.85	2	1.6	0.92
	Maximum	.	.	4.9	19	.	3.1	13	4.1	17.1	2	1.6	3.6
	Median	.	.	2.2	6.5	.	1.965	2.8	1.25	3.9	2	1.6	1.115
	Mean	.	.	2.62	7.61	.	1.97	4.86	1.90	6.55	2.00	1.60	1.69
	Std. Deviation	.	.	1.48	5.65	.	1.61	4.59	1.48	5.95	.	.	1.29

1. All units are in micrograms per cubic meter of air (ug/m^3)
2. All samples were analyzed utilizing EPA Method TO-15.
3. VOCs were not detected in any of the three "Trip Blank" SUMMA canisters.
4. "c" – EPA classifies as Carcinogen
5. "nc" – EPA classifies as Non-Carcinogen.
6. Occupational Safety and Health Permissible Exposure Limits (OSHA PELs) and American Conference of Industrial Hygienists Threshold Limit Values (TLVs®) were converted from parts per billion (ppb) to ug/m^3 using the following formula: $ug/m^3=(ppb*MW)/24.45$.
7. US EPA Regional Screening Levels, November 2012, adjusted to 1E-05 for carcinogens; HI of 1.0 for non-carcinogens.
8. Pennsylvania Department of Environmental Protection (PADEP), Bureau of Land Recycling and Land Management, Technical Guidance Manual-Section IV.A.4 Vapor Intrusion into buildings from Groundwater and Soil under the Act 2 Statewide Health Standard. January 24, 2004 (Table 3-Indoor Air Criteria).

APPENDIX A

LABORATORY REPORT

November 8, 2012

John Reiter
Stantec Consulting Services, Inc.
12075 Corporate Pkwy, Ste. 200
Mequon, WI 53092

RE: Sunoco IH Air Testing / 213402094

Dear John:

Enclosed are the results of the samples submitted to our laboratory on October 31, 2012. For your reference, these analyses have been assigned our service request number P1204493.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Samantha Henningsen
Project Manager

Client: Stantec Consulting Services, Inc. Service Request No: P1204493
Project: Sunoco IH Air Testing / 213402094

CASE NARRATIVE

The samples were received intact under chain of custody on October 31, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Stantec Consulting Services, Inc. Service Request: P1204493
Project ID: Sunoco IH Air Testing / 213402094

Date Received: 10/31/2012
Time Received: 09:10

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
Sample 1	P1204493-001	Air	10/24/2012	14:35	AC01003	-3.85	3.67	X
Sample 2	P1204493-002	Air	10/24/2012	14:39	AC00760	-6.54	3.79	X
Sample 3	P1204493-003	Air	10/24/2012	14:50	AC01853	-3.60	3.61	X
Sample 4	P1204493-004	Air	10/24/2012	14:52	AC01010	-3.29	3.63	X
Sample 5	P1204493-005	Air	10/24/2012	15:07	AC01928	-3.21	3.60	X
Sample 6	P1204493-006	Air	10/24/2012	15:10	AC01669	-4.20	3.70	X
Sample 7	P1204493-007	Air	10/24/2012	15:13	AC00641	-3.08	3.75	X
Sample 8	P1204493-008	Air	10/24/2012	15:16	AC00747	-3.67	3.78	X
Sample 9	P1204493-009	Air	10/24/2012	16:26	AC01113	-3.10	3.67	X
Sample 10	P1204493-010	Air	10/24/2012	16:31	AC01436	-5.08	3.56	X
Sample 11	P1204493-011	Air	10/24/2012	16:33	AC01376	-3.84	3.74	X
Sample 12	P1204493-012	Air	10/24/2012	16:37	AC00672	-2.29	3.58	X
Sample 13	P1204493-013	Air	10/24/2012	16:40	AC01145	-4.00	3.75	X
Sample 14	P1204493-014	Air	10/24/2012	16:44	AC00782	0.31	3.62	X
Sample 15	P1204493-015	Air	10/24/2012	16:48	AC00475	-1.47	3.55	X
Sample 16	P1204493-016	Air	10/24/2012	16:54	AC01263	-3.77	3.76	X
Sample 17	P1204493-017	Air	10/24/2012	17:10	AC01215	-2.97	3.72	X
Sample 18	P1204493-018	Air	10/24/2012	17:13	AC01670	-2.52	3.64	X
Sample 19	P1204493-019	Air	10/24/2012	17:27	AC01930	-2.75	3.57	X
Sample 20	P1204493-020	Air	10/24/2012	17:30	AC01420	-3.07	3.72	X
Sample 21	P1204493-021	Air	10/24/2012	17:35	AC01464	-1.69	3.65	X
Sample 22	P1204493-022	Air	10/24/2012	17:51	AC00590	-2.29	3.77	X
Sample 24 TB	P1204493-023	Air	10/24/2012	00:00	AC01830	-14.50	3.68	X

Columbia Analytical Services

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Simi Valley, California 93065
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Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. P1204493

Company Name & Address (Reporting Information)	Stantec 12075 Corporate Pkwy Mequon, WI 53092
Project Manager	John Reiter
Phone	262-643-9154
Fax	262-241-4901
Email Address for Result Reporting	John.Reiter@Stantec.com
Project Name	Sunoco IH Airtesting
Project Number	21340294
P.O. # / Billing Information	John Reiter
Sampler (Print & Sign)	
CAS Contact:	

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method	Comments e.g. Actual Preservative or specific instructions
Sample 1	1-3.54	10/24/12	10:35 14:35	AC01003	FCA00317	29.5	8			
Sample 2	2-6.55	10/24/12	10:37 14:39	AC00760	FCA00595	29.5	13.0			
Sample 3	3-3.63	10/24/12	10:50 14:50	AC01853	FCA00134	29.5	7.0			
Sample 4	4-3.33	10/24/12	10:53 14:53	AC01010	FCA00188	29.6	7.25			
Sample 5	5-3.14	10/24/12	11:07 15:07	AC01928	FCA00161	29.5	9.0			
Sample 6	6-4.21	10/24/12	11:10 15:10	AC01689	FCA00564	29.5	9.0			
Sample 7	7-3.57	10/24/12	11:13 15:13	AC00641	FCA00023	29.5	6.5			
Sample 8	8-3.67	10/24/12	11:16 15:16	AC00747	FCA00604	29.5	7.5			
Sample 9	9-3.14	10/24/12	12:26 16:26	AC01113	FCA00575	29.5	7.0			
Sample 10	10-5.11	10/24/12	12:31 16:31	AC01436	FCA00521	29.4	10.0			
Sample 11	11-3.87	10/24/12	12:33 16:33	AC01376	FCA00344	29.4	8.0			
Sample 12	12-2.33	10/24/12	12:36 16:37	AC00672	FCA00198	29.4	4.75			
Sample 13	13-4.03	10/24/12	12:40 16:40	AC00[redacted]145	FCA00374	29.4	6.5			
Sample 14	14-0.85	10/24/12	12:39 16:44	AC00782	FCA00298	29.6	0.0			

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	10/24/12	1830		10/24/12	0910
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ___ °C

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Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. R12344A3

CAS Contact:

Analysis Method

Company Name & Address (Reporting Information)
Stantec
12075 Corporate Pkwy
Mequon, WI 53092

Project Name: Sunoco IH Air Testing

Project Number: 2134102094

Project Manager: John Reiter

P.O. # / Billing Information: John Reiter

Phone: 262-643-9154 Fax: 262-241-4901

Email Address for Result Reporting: John.reiter@stantec.com

Sampler (Print & Sign): Richard Page

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			
Sample 15	(15)-1.53	10/24/12	12:48 16:49	AC00475	FCA00402	29.5	3.5				
Sample 16	(16)-3.82	10/24/12	12:58 16:54	AC01263	FCA00516	29.4	9.5				
Sample 17	(17)-3.04	10/24/12	13:10 17:10	AC01215	FCA00365	29.5	8.0				
Sample 18	(18)-2.63	10/24/12	13:13 17:13	AC01670	FCA00319	29.6	5.5				
Sample 19	(19)-2.77	10/24/12	13:27 17:27	AC01930	FCA00016	29.5	7.0				
Sample 20	(20)-3.14	10/24/12	13:38 17:38	AC01420	FCA00397	29.5	6.25				
Sample 21	(21)-1.76	10/24/12	13:35 17:35	AC01464	FCA00034	29.5	3.0				
Sample 22	(22)-2.34	10/24/12	13:51 17:51	AC00590	FCA00168	29.8	7.75				
~~Sample 23~~		10/24/12	13:54	~~AC01664~~	~~FCA00422~~	~~29.5~~					Not Collected
Sample 24TB	(23)-14.47	10/24/12	—	AC01830	—	29.4	29.4				

5 of 39

Report Tier Levels - please select
Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____
EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	10/24/12	18:30		10/25/12	0910
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

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Sample Acceptance Check Form

Client: Stantec Consulting Services, Inc. Work order: P1204493

Project: Sunoco IH Air Testing / 213402094

Sample(s) received on: 10/31/12 Date opened: 10/31/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1204493-001.01	6.0 L Ambient Can					
P1204493-002.01	6.0 L Ambient Can					
P1204493-003.01	6.0 L Ambient Can					
P1204493-004.01	6.0 L Ambient Can					
P1204493-005.01	6.0 L Ambient Can					
P1204493-006.01	6.0 L Ambient Can					
P1204493-007.01	6.0 L Ambient Can					
P1204493-008.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Sample Acceptance Check Form

Client: Stantec Consulting Services, Inc. Work order: P1204493

Project: Sunoco IH Air Testing / 213402094

Sample(s) received on: 10/31/12 Date opened: 10/31/12 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1204493-009.01	6.0 L Ambient Can					
P1204493-010.01	6.0 L Ambient Can					
P1204493-011.01	6.0 L Ambient Can					
P1204493-012.01	6.0 L Ambient Can					
P1204493-013.01	6.0 L Ambient Can					
P1204493-014.01	6.0 L Ambient Can					
P1204493-015.01	6.0 L Ambient Can					
P1204493-016.01	6.0 L Ambient Can					
P1204493-017.01	6.0 L Ambient Can					
P1204493-018.01	6.0 L Ambient Can					
P1204493-019.01	6.0 L Ambient Can					
P1204493-020.01	6.0 L Ambient Can					
P1204493-021.01	6.0 L Ambient Can					
P1204493-022.01	6.0 L Ambient Can					
P1204493-023.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 1** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-001

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01003

Initial Pressure (psig): -3.85 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.69

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.85	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.85	ND	0.21	
71-43-2	Benzene	**4.3**	0.85	**1.3**	0.26	
108-88-3	Toluene	**7.4**	0.85	**2.0**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.85	ND	0.11	
100-41-4	Ethylbenzene	**1.3**	0.85	**0.31**	0.19	
179601-23-1	m,p-Xylenes	**4.5**	1.7	**1.0**	0.39	
95-47-6	o-Xylene	**1.6**	0.85	**0.37**	0.19	
98-82-8	Cumene	**2.1**	0.85	**0.43**	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.85	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	**1.5**	0.85	**0.30**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 2** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-002

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00760

Initial Pressure (psig): -6.54 Final Pressure (psig): 3.79

Canister Dilution Factor: 2.27

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	1.1	ND	0.31	
107-06-2	1,2-Dichloroethane	ND	1.1	ND	0.28	
71-43-2	Benzene	**3.9**	1.1	**1.2**	0.36	
108-88-3	Toluene	**6.5**	1.1	**1.7**	0.30	
106-93-4	1,2-Dibromoethane	ND	1.1	ND	0.15	
100-41-4	Ethylbenzene	ND	1.1	ND	0.26	
179601-23-1	m,p-Xylenes	**3.7**	2.3	**0.86**	0.52	
95-47-6	o-Xylene	**1.4**	1.1	**0.32**	0.26	
98-82-8	Cumene	**2.0**	1.1	**0.40**	0.23	
108-67-8	1,3,5-Trimethylbenzene	ND	1.1	ND	0.23	
95-63-6	1,2,4-Trimethylbenzene	**1.3**	1.1	**0.26**	0.23	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 3** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-003

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01853

Initial Pressure (psig): -3.60 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.65

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.83	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.83	ND	0.20	
71-43-2	Benzene	**2.1**	0.83	**0.66**	0.26	
108-88-3	Toluene	**7.0**	0.83	**1.9**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.83	ND	0.11	
100-41-4	Ethylbenzene	**1.5**	0.83	**0.35**	0.19	
179601-23-1	m,p-Xylenes	**4.0**	1.7	**0.93**	0.38	
95-47-6	o-Xylene	**1.5**	0.83	**0.35**	0.19	
98-82-8	Cumene	**1.0**	0.83	**0.21**	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.83	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	**1.7**	0.83	**0.35**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 4** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-004

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01010

Initial Pressure (psig): -3.29 Final Pressure (psig): 3.63

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.81	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.81	ND	0.20	
71-43-2	Benzene	**1.8**	0.81	**0.56**	0.25	
108-88-3	Toluene	**6.8**	0.81	**1.8**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.81	ND	0.10	
100-41-4	Ethylbenzene	**1.2**	0.81	**0.28**	0.19	
179601-23-1	m,p-Xylenes	**3.8**	1.6	**0.88**	0.37	
95-47-6	o-Xylene	**1.4**	0.81	**0.33**	0.19	
98-82-8	Cumene	ND	0.81	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.81	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.5**	0.81	**0.31**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 5**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-005

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01928

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/3/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.21 Final Pressure (psig): 3.60

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.80	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.80	ND	0.20	
71-43-2	Benzene	**3.5**	0.80	**1.1**	0.25	
108-88-3	Toluene	**7.2**	0.80	**1.9**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.80	ND	0.10	
100-41-4	Ethylbenzene	**1.3**	0.80	**0.31**	0.18	
179601-23-1	m,p-Xylenes	**3.7**	1.6	**0.86**	0.37	
95-47-6	o-Xylene	**1.4**	0.80	**0.32**	0.18	
98-82-8	Cumene	**1.0**	0.80	**0.21**	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.80	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.6**	0.80	**0.33**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 6** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-006

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01669

Initial Pressure (psig): -4.20 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.75

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.88	ND	0.24	
107-06-2	1,2-Dichloroethane	ND	0.88	ND	0.22	
71-43-2	Benzene	**4.2**	0.88	**1.3**	0.27	
108-88-3	Toluene	**7.5**	0.88	**2.0**	0.23	
106-93-4	1,2-Dibromoethane	ND	0.88	ND	0.11	
100-41-4	Ethylbenzene	**2.2**	0.88	**0.50**	0.20	
179601-23-1	m,p-Xylenes	**4.6**	1.8	**1.1**	0.40	
95-47-6	o-Xylene	**1.7**	0.88	**0.38**	0.20	
98-82-8	Cumene	**1.3**	0.88	**0.26**	0.18	
108-67-8	1,3,5-Trimethylbenzene	ND	0.88	ND	0.18	
95-63-6	1,2,4-Trimethylbenzene	**1.8**	0.88	**0.37**	0.18	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 7** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-007

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00641

Initial Pressure (psig): -3.08 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.80	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.80	ND	0.20	
71-43-2	Benzene	**4.2**	0.80	**1.3**	0.25	
108-88-3	Toluene	**12**	0.80	**3.1**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.80	ND	0.10	
100-41-4	Ethylbenzene	**1.8**	0.80	**0.41**	0.18	
179601-23-1	m,p-Xylenes	**6.3**	1.6	**1.4**	0.37	
95-47-6	o-Xylene	**2.2**	0.80	**0.51**	0.18	
98-82-8	Cumene	**2.0**	0.80	**0.41**	0.16	
108-67-8	1,3,5-Trimethylbenzene	**1.2**	0.80	**0.25**	0.16	
95-63-6	1,2,4-Trimethylbenzene	**4.0**	0.80	**0.82**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 8**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-008

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC00747

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/3/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 3.78

Canister Dilution Factor: 1.68

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.84	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.84	ND	0.21	
71-43-2	Benzene	**3.1**	0.84	**0.97**	0.26	
108-88-3	Toluene	**7.8**	0.84	**2.1**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.84	ND	0.11	
100-41-4	Ethylbenzene	**1.5**	0.84	**0.34**	0.19	
179601-23-1	m,p-Xylenes	**4.9**	1.7	**1.1**	0.39	
95-47-6	o-Xylene	**1.8**	0.84	**0.42**	0.19	
98-82-8	Cumene	**1.5**	0.84	**0.30**	0.17	
108-67-8	1,3,5-Trimethylbenzene	**0.97**	0.84	**0.20**	0.17	
95-63-6	1,2,4-Trimethylbenzene	**3.2**	0.84	**0.65**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 9** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-009

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01113

Initial Pressure (psig): -3.10 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.58

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.20	
71-43-2	Benzene	**2.3**	0.79	**0.72**	0.25	
108-88-3	Toluene	**6.9**	0.79	**1.8**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**1.3**	0.79	**0.29**	0.18	
179601-23-1	m,p-Xylenes	**4.2**	1.6	**0.97**	0.36	
95-47-6	o-Xylene	**1.5**	0.79	**0.36**	0.18	
98-82-8	Cumene	**1.4**	0.79	**0.28**	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.79	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.6**	0.79	**0.32**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 10**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-010

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01436

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/3/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -5.08 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.90

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.95	ND	0.26	
107-06-2	1,2-Dichloroethane	ND	0.95	ND	0.23	
71-43-2	Benzene	**2.2**	0.95	**0.69**	0.30	
108-88-3	Toluene	**6.9**	0.95	**1.8**	0.25	
106-93-4	1,2-Dibromoethane	ND	0.95	ND	0.12	
100-41-4	Ethylbenzene	**1.2**	0.95	**0.27**	0.22	
179601-23-1	m,p-Xylenes	**3.6**	1.9	**0.83**	0.44	
95-47-6	o-Xylene	**1.3**	0.95	**0.31**	0.22	
98-82-8	Cumene	**1.0**	0.95	**0.20**	0.19	
108-67-8	1,3,5-Trimethylbenzene	ND	0.95	ND	0.19	
95-63-6	1,2,4-Trimethylbenzene	**1.3**	0.95	**0.26**	0.19	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 11**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-011

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01376

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.84 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.70

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.85	ND	0.24	
107-06-2	1,2-Dichloroethane	ND	0.85	ND	0.21	
71-43-2	Benzene	**1.6**	0.85	**0.50**	0.27	
108-88-3	Toluene	**6.1**	0.85	**1.6**	0.23	
106-93-4	1,2-Dibromoethane	ND	0.85	ND	0.11	
100-41-4	Ethylbenzene	**0.86**	0.85	**0.20**	0.20	
179601-23-1	m,p-Xylenes	**2.7**	1.7	**0.63**	0.39	
95-47-6	o-Xylene	**1.0**	0.85	**0.24**	0.20	
98-82-8	Cumene	ND	0.85	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.85	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	**0.93**	0.85	**0.19**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 12** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-012

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00672

Initial Pressure (psig): -2.29 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.47

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.74	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.74	ND	0.18	
71-43-2	Benzene	**1.7**	0.74	**0.54**	0.23	
108-88-3	Toluene	**6.2**	0.74	**1.6**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.74	ND	0.096	
100-41-4	Ethylbenzene	**0.99**	0.74	**0.23**	0.17	
179601-23-1	m,p-Xylenes	**2.9**	1.5	**0.67**	0.34	
95-47-6	o-Xylene	**1.1**	0.74	**0.25**	0.17	
98-82-8	Cumene	ND	0.74	ND	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.74	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**1.0**	0.74	**0.21**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 13**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-013

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01145

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/6/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.00 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.86	ND	0.24	
107-06-2	1,2-Dichloroethane	ND	0.86	ND	0.21	
71-43-2	Benzene	**1.5**	0.86	**0.47**	0.27	
108-88-3	Toluene	**5.6**	0.86	**1.5**	0.23	
106-93-4	1,2-Dibromoethane	ND	0.86	ND	0.11	
100-41-4	Ethylbenzene	**0.86**	0.86	**0.20**	0.20	
179601-23-1	m,p-Xylenes	**2.6**	1.7	**0.60**	0.40	
95-47-6	o-Xylene	**0.96**	0.86	**0.22**	0.20	
98-82-8	Cumene	ND	0.86	ND	0.18	
108-67-8	1,3,5-Trimethylbenzene	ND	0.86	ND	0.18	
95-63-6	1,2,4-Trimethylbenzene	ND	0.86	ND	0.18	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 14** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-014

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00782

Initial Pressure (psig): 0.31 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.22

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.61	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.61	ND	0.15	
71-43-2	Benzene	**1.6**	0.61	**0.51**	0.19	
108-88-3	Toluene	**6.0**	0.61	**1.6**	0.16	
106-93-4	1,2-Dibromoethane	ND	0.61	ND	0.079	
100-41-4	Ethylbenzene	**1.1**	0.61	**0.26**	0.14	
179601-23-1	m,p-Xylenes	**3.0**	1.2	**0.70**	0.28	
95-47-6	o-Xylene	**1.1**	0.61	**0.26**	0.14	
98-82-8	Cumene	**0.79**	0.61	**0.16**	0.12	
108-67-8	1,3,5-Trimethylbenzene	ND	0.61	ND	0.12	
95-63-6	1,2,4-Trimethylbenzene	**1.0**	0.61	**0.20**	0.12	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 15**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-015

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC00475

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.47 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.38

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.69	ND	0.19	
107-06-2	1,2-Dichloroethane	ND	0.69	ND	0.17	
71-43-2	Benzene	**1.9**	0.69	**0.61**	0.22	
108-88-3	Toluene	**6.4**	0.69	**1.7**	0.18	
106-93-4	1,2-Dibromoethane	ND	0.69	ND	0.090	
100-41-4	Ethylbenzene	**1.2**	0.69	**0.28**	0.16	
179601-23-1	m,p-Xylenes	**3.4**	1.4	**0.78**	0.32	
95-47-6	o-Xylene	**1.2**	0.69	**0.29**	0.16	
98-82-8	Cumene	**1.0**	0.69	**0.21**	0.14	
108-67-8	1,3,5-Trimethylbenzene	ND	0.69	ND	0.14	
95-63-6	1,2,4-Trimethylbenzene	**1.2**	0.69	**0.25**	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 16**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-016

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01263

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.77 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.69

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.85	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.85	ND	0.21	
71-43-2	Benzene	**1.3**	0.85	**0.42**	0.26	
108-88-3	Toluene	**4.6**	0.85	**1.2**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.85	ND	0.11	
100-41-4	Ethylbenzene	ND	0.85	ND	0.19	
179601-23-1	m,p-Xylenes	**2.0**	1.7	**0.46**	0.39	
95-47-6	o-Xylene	ND	0.85	ND	0.19	
98-82-8	Cumene	ND	0.85	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.85	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	ND	0.85	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 17**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-017

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01215

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.97 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.19	
71-43-2	Benzene	**9.0**	0.79	**2.8**	0.25	
108-88-3	Toluene	**8.3**	0.79	**2.2**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**1.8**	0.79	**0.41**	0.18	
179601-23-1	m,p-Xylenes	**4.3**	1.6	**0.98**	0.36	
95-47-6	o-Xylene	**1.5**	0.79	**0.34**	0.18	
98-82-8	Cumene	**2.5**	0.79	**0.50**	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.79	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.3**	0.79	**0.25**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 18**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-018

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01670

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.52 Final Pressure (psig): 3.64

Canister Dilution Factor: 1.51

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.76	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.76	ND	0.19	
71-43-2	Benzene	**7.2**	0.76	**2.2**	0.24	
108-88-3	Toluene	**8.2**	0.76	**2.2**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.76	ND	0.098	
100-41-4	Ethylbenzene	**0.97**	0.76	**0.22**	0.17	
179601-23-1	m,p-Xylenes	**3.2**	1.5	**0.75**	0.35	
95-47-6	o-Xylene	**1.2**	0.76	**0.28**	0.17	
98-82-8	Cumene	**1.9**	0.76	**0.39**	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.76	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**1.2**	0.76	**0.24**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 19**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-019

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01930

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.75 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.77	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.77	ND	0.19	
71-43-2	Benzene	**3.6**	0.77	**1.1**	0.24	
108-88-3	Toluene	**14**	0.77	**3.6**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.77	ND	0.10	
100-41-4	Ethylbenzene	**2.9**	0.77	**0.66**	0.18	
179601-23-1	m,p-Xylenes	**11**	1.5	**2.6**	0.35	
95-47-6	o-Xylene	**3.7**	0.77	**0.85**	0.18	
98-82-8	Cumene	**0.77**	0.77	**0.16**	0.16	
108-67-8	1,3,5-Trimethylbenzene	**1.3**	0.77	**0.27**	0.16	
95-63-6	1,2,4-Trimethylbenzene	**3.3**	0.77	**0.68**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 20**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-020

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01420

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/6/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.07 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.58

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.20	
71-43-2	Benzene	**2.1**	0.79	**0.65**	0.25	
108-88-3	Toluene	**7.4**	0.79	**2.0**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**0.83**	0.79	**0.19**	0.18	
179601-23-1	m,p-Xylenes	**2.8**	1.6	**0.65**	0.36	
95-47-6	o-Xylene	**1.1**	0.79	**0.24**	0.18	
98-82-8	Cumene	ND	0.79	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.79	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**0.92**	0.79	**0.19**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 21**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-021

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01464

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.69 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.41

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.71	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.71	ND	0.17	
71-43-2	Benzene	**4.9**	0.71	**1.5**	0.22	
108-88-3	Toluene	**19**	0.71	**5.0**	0.19	
106-93-4	1,2-Dibromoethane	ND	0.71	ND	0.092	
100-41-4	Ethylbenzene	**3.1**	0.71	**0.70**	0.16	
179601-23-1	m,p-Xylenes	**13**	1.4	**3.0**	0.32	
95-47-6	o-Xylene	**4.1**	0.71	**0.94**	0.16	
98-82-8	Cumene	ND	0.71	ND	0.14	
108-67-8	1,3,5-Trimethylbenzene	**1.6**	0.71	**0.33**	0.14	
95-63-6	1,2,4-Trimethylbenzene	**3.6**	0.71	**0.74**	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 22** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P1204493-022

Test Code: EPA TO-15 Date Collected: 10/24/12
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 10/31/12
Analyst: Wida Ang Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00590

Initial Pressure (psig): -2.29 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.49

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.75	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.75	ND	0.18	
71-43-2	Benzene	**1.7**	0.75	**0.53**	0.23	
108-88-3	Toluene	**9.2**	0.75	**2.4**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.75	ND	0.097	
100-41-4	Ethylbenzene	**1.7**	0.75	**0.39**	0.17	
179601-23-1	m,p-Xylenes	**4.6**	1.5	**1.1**	0.34	
95-47-6	o-Xylene	**1.5**	0.75	**0.34**	0.17	
98-82-8	Cumene	**0.85**	0.75	**0.17**	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.75	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**1.2**	0.75	**0.24**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 24 TB**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-023

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01830

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121103-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121105-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121106-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/6/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

SURROGATE SPIKE RECOVERY RESULTS

Client: **Stantec Consulting Services, Inc.**
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Project ID: P1204493

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 10/24/12
Analyst: Wida Ang Date(s) Received: 10/31/12
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 11/3 - 11/6/12
Test Notes:

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P121103-MB	**97**	**98**	**102**	70-130	
Method Blank	P121105-MB	**96**	**102**	**104**	70-130	
Method Blank	P121106-MB	**94**	**100**	**106**	70-130	
Lab Control Sample	P121103-LCS	**99**	**101**	**104**	70-130	
Lab Control Sample	P121105-LCS	**97**	**98**	**106**	70-130	
Lab Control Sample	P121106-LCS	**97**	**100**	**108**	70-130	
Sample 1	P1204493-001	**97**	**99**	**104**	70-130	
Sample 2	P1204493-002	**101**	**98**	**102**	70-130	
Sample 3	P1204493-003	**100**	**98**	**104**	70-130	
Sample 3	P1204493-003DUP	**98**	**95**	**103**	70-130	
Sample 4	P1204493-004	**102**	**96**	**105**	70-130	
Sample 5	P1204493-005	**97**	**98**	**106**	70-130	
Sample 6	P1204493-006	**98**	**98**	**105**	70-130	
Sample 7	P1204493-007	**98**	**96**	**107**	70-130	
Sample 8	P1204493-008	**96**	**100**	**108**	70-130	
Sample 9	P1204493-009	**99**	**98**	**107**	70-130	
Sample 10	P1204493-010	**97**	**100**	**105**	70-130	
Sample 11	P1204493-011	**98**	**98**	**106**	70-130	
Sample 12	P1204493-012	**95**	**101**	**106**	70-130	
Sample 13	P1204493-013	**96**	**97**	**107**	70-130	
Sample 14	P1204493-014	**96**	**101**	**107**	70-130	
Sample 15	P1204493-015	**97**	**100**	**103**	70-130	
Sample 15	P1204493-015DUP	**94**	**104**	**110**	70-130	
Sample 16	P1204493-016	**97**	**97**	**105**	70-130	
Sample 17	P1204493-017	**99**	**98**	**109**	70-130	
Sample 18	P1204493-018	**96**	**100**	**106**	70-130	
Sample 19	P1204493-019	**96**	**101**	**107**	70-130	
Sample 20	P1204493-020	**95**	**101**	**108**	70-130	
Sample 21	P1204493-021	**98**	**98**	**102**	70-130	
Sample 22	P1204493-022	**97**	**99**	**100**	70-130	
Sample 24 TB	P1204493-023	**94**	**105**	**103**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121103-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/03/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	CAS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	204	**231**	**113**	67-116	
107-06-2	1,2-Dichloroethane	208	**220**	**106**	70-118	
71-43-2	Benzene	208	**214**	**103**	66-121	
108-88-3	Toluene	208	**211**	**101**	67-111	
106-93-4	1,2-Dibromoethane	208	**228**	**110**	73-122	
100-41-4	Ethylbenzene	206	**217**	**105**	71-117	
179601-23-1	m,p-Xylenes	412	**427**	**104**	70-116	
95-47-6	o-Xylene	200	**212**	**106**	70-116	
98-82-8	Cumene	196	**210**	**107**	70-116	
108-67-8	1,3,5-Trimethylbenzene	208	**230**	**111**	71-121	
95-63-6	1,2,4-Trimethylbenzene	200	**228**	**114**	73-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121105-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/05/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	CAS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	204	**210**	**103**	67-116	
107-06-2	1,2-Dichloroethane	208	**199**	**96**	70-118	
71-43-2	Benzene	208	**199**	**96**	66-121	
108-88-3	Toluene	208	**191**	**92**	67-111	
106-93-4	1,2-Dibromoethane	208	**211**	**101**	73-122	
100-41-4	Ethylbenzene	206	**205**	**100**	71-117	
179601-23-1	m,p-Xylenes	412	**407**	**99**	70-116	
95-47-6	o-Xylene	200	**202**	**101**	70-116	
98-82-8	Cumene	196	**198**	**101**	70-116	
108-67-8	1,3,5-Trimethylbenzene	208	**216**	**104**	71-121	
95-63-6	1,2,4-Trimethylbenzene	200	**213**	**107**	73-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1204493
Client Project ID: **Sunoco IH Air Testing / 213402094** CAS Sample ID: P121106-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 11/06/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	CAS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	204	**221**	**108**	67-116	
107-06-2	1,2-Dichloroethane	208	**209**	**100**	70-118	
71-43-2	Benzene	208	**203**	**98**	66-121	
108-88-3	Toluene	208	**202**	**97**	67-111	
106-93-4	1,2-Dibromoethane	208	**221**	**106**	73-122	
100-41-4	Ethylbenzene	206	**210**	**102**	71-117	
179601-23-1	m,p-Xylenes	412	**416**	**101**	70-116	
95-47-6	o-Xylene	200	**206**	**103**	70-116	
98-82-8	Cumene	196	**206**	**105**	70-116	
108-67-8	1,3,5-Trimethylbenzene	208	**226**	**109**	71-121	
95-63-6	1,2,4-Trimethylbenzene	200	**223**	**112**	73-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 3**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-003DUP

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01853

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/3/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.60
Final Pressure (psig): 3.61

Canister Dilution Factor: 1.65

Compound	Sample Result µg/m³	Sample Result ppbV	Duplicate Sample Result **µg/m³**	Duplicate Sample Result ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
1,2-Dichloroethane	ND	ND	ND	ND	-	-	25	
Benzene	2.12	0.663	2.30	0.721	2.21	**8**	25	
Toluene	6.97	1.85	6.97	1.85	6.97	**0**	25	
1,2-Dibromoethane	ND	ND	ND	ND	-	-	25	
Ethylbenzene	1.53	0.352	1.58	0.364	1.555	**3**	25	
m,p-Xylenes	4.03	0.928	4.16	0.957	4.095	**3**	25	
o-Xylene	1.51	0.348	1.54	0.356	1.525	**2**	25	
Cumene	1.02	0.209	1.03	0.210	1.025	**1**	25	
1,3,5-Trimethylbenzene	ND	ND	ND	ND	-	-	25	
1,2,4-Trimethylbenzene	1.73	0.352	1.78	0.362	1.755	**3**	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 15**
Client Project ID: **Sunoco IH Air Testing / 213402094**

CAS Project ID: P1204493
CAS Sample ID: P1204493-015DUP

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC00475

Date Collected: 10/24/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.47
Final Pressure (psig): 3.55

Canister Dilution Factor: 1.38

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	Duplicate Sample Result ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
1,2-Dichloroethane	ND	ND	ND	ND	-	-	25	
Benzene	1.95	0.609	2.06	0.645	2.005	**5**	25	
Toluene	6.44	1.71	6.80	1.80	6.62	**5**	25	
1,2-Dibromoethane	ND	ND	ND	ND	-	-	25	
Ethylbenzene	1.21	0.279	1.21	0.279	1.21	**0**	25	
m,p-Xylenes	3.40	0.784	3.41	0.785	3.405	**0.3**	25	
o-Xylene	1.25	0.288	1.28	0.294	1.265	**2**	25	
Cumene	1.01	0.205	1.08	0.220	1.045	**7**	25	
1,3,5-Trimethylbenzene	ND	ND	ND	ND	-	-	25	
1,2,4-Trimethylbenzene	1.24	0.251	1.28	0.261	1.26	**3**	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

LABORATORY REPORT

November 8, 2012

John Reiter
Stantec Consulting Services, Inc.
12075 Corporate Pkwy, Ste. 200
Mequon, WI 53092

RE: Sunoco IH Air Testing / 213402094

Dear John:

Enclosed are the results of the samples submitted to our laboratory on October 31, 2012. For your reference, these analyses have been assigned our service request number P1204494.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Samantha Henningsen
Project Manager

Client: Stantec Consulting Services, Inc. Service Request No: P1204494
Project: Sunoco IH Air Testing / 213402094

CASE NARRATIVE

The samples were received intact under chain of custody on October 31, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Stantec Consulting Services, Inc.
Service Request: P1204494
Project ID: Sunoco IH Testing / 213402094

Date Received: 10/31/2012
Time Received: 09:10

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
Sample 23	P1204494-001	Air	10/25/2012	12:17	AC01664	-6.14	3.79	X
Sample 25	P1204494-002	Air	10/25/2012	00:00	AC01093	-14.50	3.74	X
Sample 26	P1204494-003	Air	10/25/2012	12:59	AC00540	-3.15	3.59	X
Sample 27	P1204494-004	Air	10/25/2012	13:08	AC01810	-4.85	3.59	X
Sample 28	P1204494-005	Air	10/25/2012	13:10	AC01350	-2.60	3.71	X
Sample 29	P1204494-006	Air	10/25/2012	12:23	AC00716	-0.41	4.20	X
Sample 30	P1204494-007	Air	10/25/2012	12:29	AC00501	-2.50	3.61	X
Sample 31	P1204494-008	Air	10/25/2012	12:34	AC00765	-3.73	3.68	X
Sample 32	P1204494-009	Air	10/25/2012	12:37	AC01403	-5.30	3.76	X
Sample 33	P1204494-010	Air	10/25/2012	12:41	AC01573	-0.55	3.66	X
Sample 34	P1204494-011	Air	10/25/2012	12:44	AC00947	-2.79	3.49	X
Sample 35	P1204494-012	Air	10/25/2012	12:48	AC00033	-2.24	3.50	X
Sample 36	P1204494-013	Air	10/25/2012	12:51	AC01790	-2.23	3.48	X
Sample 37	P1204494-014	Air	10/25/2012	13:00	AC01886	-3.04	3.62	X
Sample 38	P1204494-015	Air	10/25/2012	13:08	AC01487	-2.38	3.62	X
Sample 39	P1204494-016	Air	10/25/2012	13:40	AC01115	-3.59	3.71	X
Sample 40	P1204494-017	Air	10/25/2012	13:43	AC01243	-0.40	3.96	X
Sample 41	P1204494-018	Air	10/25/2012	13:51	AC01218	-3.00	3.67	X
Sample 42	P1204494-019	Air	10/25/2012	13:55	AC01179	-1.52	3.71	X
Sample 43	P1204494-020	Air	10/25/2012	14:00	AC00870	-3.27	3.76	X
Sample 44	P1204494-021	Air	10/25/2012	10:05	AC00993	-14.47	3.72	X

Columbia Analytical Services™
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No.: P120494

CAS Contact:

Company Name & Address (Reporting Information): Stantec 12075 Corporate Pky Mequon, WI 53092

Project Name: Sunoco IH Testing

Project Number: 21340294

Project Manager: John Reiter

P.O. # / Billing Information: John Reiter

Phone: 262-

Fax: 262-241-4901

Email Address for Result Reporting: John.REITER@Stantec.com

Sampler (Print & Sign): Richard Pager

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method	Comments e.g. Actual Preservative or specific instructions
Sample 23	①-6.16	10/25/12	8:17 12:17	AC01664	FCA00422	29.0	11.0			
Sample 25	②-14.45	10/25/12		AC01093	FCA00058	29.5	—			Field Blank
Sample 26	③-3.18	10/25/12	8:59 12:59	AC00540	FCA00482	29.3	8.5			
Sample 27	④-4.58	10/25/12	9:07 13:07	AC01830	FCA00609	29.4	8.0			
Sample 28	⑤-2.65	10/25/12	9:19 13:19	AC01350	FCA00454	29.5	5.0			
Sample 29	⑥-0.47	10/25/12	8:23 12:23	AC00716	FCA00239	29.5	0.0			
Sample 30	⑦-2.59	10/25/12	8:29 12:29	AC00501	FCA00015	29.5	6.0			
Sample 31	⑧-3.74	10/25/12	8:34 12:34	AC00765	FCA00303	29.5	5.75			
Sample 32	⑨-5.62	10/25/12	8:37 12:37	AC01403	FCA00432	29.5	10.0			
Sample 33	⑩-0.55	10/25/12	8:41 12:41	AC01573	FCA00449	29.5	3.0			
Sample 34	⑪-2.74	10/25/12	8:44 12:44	AC00947	FCA00632	29.5	5.0			
Sample 35	⑫-2.27	10/25/12	8:48 12:48	AC00933	FCA00473	29.5	4.0			
Sample 36	⑬-2.23	10/25/12	8:51 12:51	AC01790	FCA00538	29.5	3.5			
Sample 37	⑭-3.03	10/25/12	9:00 13:00	AC01886	FCA00275	29.5	5.0			

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Richard Pager	10/25	15:09		10/26/12	0910
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

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Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. R1204494

Company Name & Address (Reporting Information)

Project Name

Project Number

CAS Contact:

Analysis Method

Project Manager

P.O. # / Billing Information

Phone | Fax

Email Address for Result Reporting

Sampler (Print & Sign) Richard. Pager Richard Pager

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume
Sample 38	(15)-2.26	10/25/12	9:08 13:02	AC01487	FCA00418	29.5	4.5	
Sample 39	(16)-3.56	10/25/12	9:40 13:40	AC01115	FCA00503	29.6	6.5	
Sample 40	(17)-0.45	10/25/12	9:43 13:43	AC01243	FCA00603	29.4	2.0	
Sample 41	(18)-3.00	10/25/12	9:51 13:51	AC01218	FCA00405	29.6	9.0	
Sample 42	(19)-1.55	10/25/12	9:55 13:55	AC01179	FCA00040	29.6	4.75	
Sample 43	(20)-3.31	10/25/12	10:00 14:00	AC00870	FCA00215	29.5	6.0	
Sample 44	(21)-14.40	10/25/12	10:05	AC00993	FCA00619	29.3	~~Ref~~ Field	Blank
	-1941(3)							

5 of 84

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____
EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Richard Pager	10/25	15:09		10/26/12	0940
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

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Sample Acceptance Check Form

Client: Stantec Consulting Services, Inc. Work order: P1204494

Project: Sunoco IH Testing / 213402094

Sample(s) received on: 10/31/12 Date opened: 10/31/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☐	☒	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☐	☒	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1204494-001.01	6.0 L Ambient Can					
P1204494-002.01	6.0 L Ambient Can					
P1204494-003.01	6.0 L Ambient Can					
P1204494-004.01	6.0 L Ambient Can					
P1204494-005.01	6.0 L Ambient Can					
P1204494-006.01	6.0 L Ambient Can					
P1204494-007.01	6.0 L Ambient Can					
P1204494-008.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers):

Sample -002 has an ID of "Sample 25" on the COC, and "Sample 28" on the canister tag.

Sample -004 has canister SN AC01830, we received canister AC01810.

Sample -018 has an ID of "Sample 41" on the COC, and "Sample 40" on the canister tag.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Sample Acceptance Check Form

Client: Stantec Consulting Services, Inc. Work order: P1204494

Project: Sunoco IH Testing / 213402094

Sample(s) received on: 10/31/12 Date opened: 10/31/12 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1204494-009.01	6.0 L Ambient Can					
P1204494-010.01	6.0 L Ambient Can					
P1204494-011.01	6.0 L Ambient Can					
P1204494-012.01	6.0 L Ambient Can					
P1204494-013.01	6.0 L Ambient Can					
P1204494-014.01	6.0 L Ambient Can					
P1204494-015.01	6.0 L Ambient Can					
P1204494-016.01	6.0 L Ambient Can					
P1204494-017.01	6.0 L Ambient Can					
P1204494-018.01	6.0 L Ambient Can					
P1204494-019.01	6.0 L Ambient Can					
P1204494-020.01	6.0 L Ambient Can					
P1204494-021.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 23** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-001

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01664

Initial Pressure (psig): -6.14 Final Pressure (psig): 3.79

Canister Dilution Factor: 2.16

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	1.1	ND	0.30	
107-06-2	1,2-Dichloroethane	ND	1.1	ND	0.27	
71-43-2	Benzene	ND	1.1	ND	0.34	
108-88-3	Toluene	**3.8**	1.1	**1.0**	0.29	
106-93-4	1,2-Dibromoethane	ND	1.1	ND	0.14	
100-41-4	Ethylbenzene	ND	1.1	ND	0.25	
179601-23-1	m,p-Xylenes	ND	2.2	ND	0.50	
95-47-6	o-Xylene	ND	1.1	ND	0.25	
98-82-8	Cumene	ND	1.1	ND	0.22	
108-67-8	1,3,5-Trimethylbenzene	ND	1.1	ND	0.22	
95-63-6	1,2,4-Trimethylbenzene	ND	1.1	ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 25**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01093

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/2/12
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 26** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-003

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00540

Initial Pressure (psig): -3.15 Final Pressure (psig): 3.59

Canister Dilution Factor: 1.58

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.20	
71-43-2	Benzene	**2.1**	0.79	**0.67**	0.25	
108-88-3	Toluene	**4.0**	0.79	**1.1**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**0.99**	0.79	**0.23**	0.18	
179601-23-1	m,p-Xylenes	**3.8**	1.6	**0.87**	0.36	
95-47-6	o-Xylene	**1.3**	0.79	**0.31**	0.18	
98-82-8	Cumene	**1.1**	0.79	**0.22**	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.79	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.4**	0.79	**0.29**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 27** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-004

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01810

Initial Pressure (psig): -4.85 Final Pressure (psig): 3.59

Canister Dilution Factor: 1.86

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.93	ND	0.26	
107-06-2	1,2-Dichloroethane	ND	0.93	ND	0.23	
71-43-2	Benzene	**2.3**	0.93	**0.71**	0.29	
108-88-3	Toluene	**3.6**	0.93	**0.96**	0.25	
106-93-4	1,2-Dibromoethane	ND	0.93	ND	0.12	
100-41-4	Ethylbenzene	ND	0.93	ND	0.21	
179601-23-1	m,p-Xylenes	**3.0**	1.9	**0.69**	0.43	
95-47-6	o-Xylene	**1.1**	0.93	**0.26**	0.21	
98-82-8	Cumene	ND	0.93	ND	0.19	
108-67-8	1,3,5-Trimethylbenzene	ND	0.93	ND	0.19	
95-63-6	1,2,4-Trimethylbenzene	ND	0.93	ND	0.19	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 28** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-005

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01350

Initial Pressure (psig): -2.60 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.76	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.76	ND	0.19	
71-43-2	Benzene	**2.3**	0.76	**0.70**	0.24	
108-88-3	Toluene	**2.0**	0.76	**0.54**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.76	ND	0.099	
100-41-4	Ethylbenzene	ND	0.76	ND	0.18	
179601-23-1	m,p-Xylenes	ND	1.5	ND	0.35	
95-47-6	o-Xylene	ND	0.76	ND	0.18	
98-82-8	Cumene	ND	0.76	ND	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.76	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	ND	0.76	ND	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 29** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-006

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00716

Initial Pressure (psig): -0.41 Final Pressure (psig): 4.20

Canister Dilution Factor: 1.32

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.66	ND	0.18	
107-06-2	1,2-Dichloroethane	ND	0.66	ND	0.16	
71-43-2	Benzene	**1.6**	0.66	**0.50**	0.21	
108-88-3	Toluene	**6.5**	0.66	**1.7**	0.18	
106-93-4	1,2-Dibromoethane	ND	0.66	ND	0.086	
100-41-4	Ethylbenzene	**0.95**	0.66	**0.22**	0.15	
179601-23-1	m,p-Xylenes	**3.3**	1.3	**0.76**	0.30	
95-47-6	o-Xylene	**1.1**	0.66	**0.25**	0.15	
98-82-8	Cumene	ND	0.66	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.66	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	**0.99**	0.66	**0.20**	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 30** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-007

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00501

Initial Pressure (psig): -2.50 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.50

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.75	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.75	ND	0.19	
71-43-2	Benzene	**1.2**	0.75	**0.36**	0.23	
108-88-3	Toluene	**4.4**	0.75	**1.2**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.75	ND	0.098	
100-41-4	Ethylbenzene	ND	0.75	ND	0.17	
179601-23-1	m,p-Xylenes	**2.3**	1.5	**0.53**	0.35	
95-47-6	o-Xylene	**0.87**	0.75	**0.20**	0.17	
98-82-8	Cumene	ND	0.75	ND	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.75	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**1.1**	0.75	**0.23**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 31** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-008

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00765

Initial Pressure (psig): -3.73 Final Pressure (psig): 3.68

Canister Dilution Factor: 1.68

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.84	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.84	ND	0.21	
71-43-2	Benzene	**1.3**	0.84	**0.41**	0.26	
108-88-3	Toluene	**4.8**	0.84	**1.3**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.84	ND	0.11	
100-41-4	Ethylbenzene	ND	0.84	ND	0.19	
179601-23-1	m,p-Xylenes	**2.5**	1.7	**0.57**	0.39	
95-47-6	o-Xylene	**0.91**	0.84	**0.21**	0.19	
98-82-8	Cumene	ND	0.84	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.84	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	**0.94**	0.84	**0.19**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 32** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-009

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01403

Initial Pressure (psig): -5.30 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.96

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.98	ND	0.27	
107-06-2	1,2-Dichloroethane	ND	0.98	ND	0.24	
71-43-2	Benzene	**1.3**	0.98	**0.41**	0.31	
108-88-3	Toluene	**5.2**	0.98	**1.4**	0.26	
106-93-4	1,2-Dibromoethane	ND	0.98	ND	0.13	
100-41-4	Ethylbenzene	ND	0.98	ND	0.23	
179601-23-1	m,p-Xylenes	**2.5**	2.0	**0.58**	0.45	
95-47-6	o-Xylene	ND	0.98	ND	0.23	
98-82-8	Cumene	ND	0.98	ND	0.20	
108-67-8	1,3,5-Trimethylbenzene	ND	0.98	ND	0.20	
95-63-6	1,2,4-Trimethylbenzene	ND	0.98	ND	0.20	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 33**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-010

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01573

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/2/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.55 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.65	ND	0.18	
107-06-2	1,2-Dichloroethane	ND	0.65	ND	0.16	
71-43-2	Benzene	**1.4**	0.65	**0.45**	0.20	
108-88-3	Toluene	**5.0**	0.65	**1.3**	0.17	
106-93-4	1,2-Dibromoethane	ND	0.65	ND	0.085	
100-41-4	Ethylbenzene	**0.93**	0.65	**0.21**	0.15	
179601-23-1	m,p-Xylenes	**3.5**	1.3	**0.81**	0.30	
95-47-6	o-Xylene	**1.1**	0.65	**0.26**	0.15	
98-82-8	Cumene	ND	0.65	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.65	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	**0.97**	0.65	**0.20**	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 34** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-011

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00947

Initial Pressure (psig): -2.79 Final Pressure (psig): 3.49

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.77	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.77	ND	0.19	
71-43-2	Benzene	**1.3**	0.77	**0.41**	0.24	
108-88-3	Toluene	**4.9**	0.77	**1.3**	0.20	
106-93-4	1,2-Dibromoethane	ND	0.77	ND	0.10	
100-41-4	Ethylbenzene	**0.89**	0.77	**0.21**	0.18	
179601-23-1	m,p-Xylenes	**3.3**	1.5	**0.75**	0.35	
95-47-6	o-Xylene	**1.3**	0.77	**0.30**	0.18	
98-82-8	Cumene	ND	0.77	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.77	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.1**	0.77	**0.23**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 35** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-012

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/3/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00033

Initial Pressure (psig): -2.24 Final Pressure (psig): 3.50

Canister Dilution Factor: 1.46

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.73	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.73	ND	0.18	
71-43-2	Benzene	**1.2**	0.73	**0.39**	0.23	
108-88-3	Toluene	**5.9**	0.73	**1.6**	0.19	
106-93-4	1,2-Dibromoethane	ND	0.73	ND	0.095	
100-41-4	Ethylbenzene	**1.0**	0.73	**0.24**	0.17	
179601-23-1	m,p-Xylenes	**3.7**	1.5	**0.84**	0.34	
95-47-6	o-Xylene	**1.4**	0.73	**0.31**	0.17	
98-82-8	Cumene	ND	0.73	ND	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.73	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**0.95**	0.73	**0.19**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 36** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-013

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01790

Initial Pressure (psig): -2.23 Final Pressure (psig): 3.48

Canister Dilution Factor: 1.46

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.73	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.73	ND	0.18	
71-43-2	Benzene	**0.94**	0.73	**0.29**	0.23	
108-88-3	Toluene	**4.0**	0.73	**1.1**	0.19	
106-93-4	1,2-Dibromoethane	ND	0.73	ND	0.095	
100-41-4	Ethylbenzene	**0.74**	0.73	**0.17**	0.17	
179601-23-1	m,p-Xylenes	**2.5**	1.5	**0.59**	0.34	
95-47-6	o-Xylene	**0.97**	0.73	**0.22**	0.17	
98-82-8	Cumene	ND	0.73	ND	0.15	
108-67-8	1,3,5-Trimethylbenzene	ND	0.73	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	**0.78**	0.73	**0.16**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 37** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-014

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01886

Initial Pressure (psig): -3.04 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.19	
71-43-2	Benzene	**11**	0.79	**3.6**	0.25	
108-88-3	Toluene	**88**	0.79	**23**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**11**	0.79	**2.5**	0.18	
179601-23-1	m,p-Xylenes	**42**	1.6	**9.7**	0.36	
95-47-6	o-Xylene	**9.1**	0.79	**2.1**	0.18	
98-82-8	Cumene	**1.3**	0.79	**0.26**	0.16	
108-67-8	1,3,5-Trimethylbenzene	**1.4**	0.79	**0.28**	0.16	
95-63-6	1,2,4-Trimethylbenzene	**3.9**	0.79	**0.79**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 38**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-015

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01487

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)
0.10 Liter(s)

Initial Pressure (psig): -2.38 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.49

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.75	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.75	ND	0.18	
71-43-2	Benzene	**8.4**	0.75	**2.6**	0.23	
108-88-3	Toluene	**330**	7.5	**87**	2.0	**D**
106-93-4	1,2-Dibromoethane	ND	0.75	ND	0.097	
100-41-4	Ethylbenzene	**6.0**	0.75	**1.4**	0.17	
179601-23-1	m,p-Xylenes	**24**	1.5	**5.5**	0.34	
95-47-6	o-Xylene	**7.6**	0.75	**1.8**	0.17	
98-82-8	Cumene	**2.6**	0.75	**0.52**	0.15	
108-67-8	1,3,5-Trimethylbenzene	**3.9**	0.75	**0.80**	0.15	
95-63-6	1,2,4-Trimethylbenzene	**11**	0.75	**2.2**	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 39**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-016

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01115

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.59 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.66

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	**0.96**	0.83	**0.27**	0.23	
107-06-2	1,2-Dichloroethane	ND	0.83	ND	0.21	
71-43-2	Benzene	**1.4**	0.83	**0.45**	0.26	
108-88-3	Toluene	**6.4**	0.83	**1.7**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.83	ND	0.11	
100-41-4	Ethylbenzene	**1.1**	0.83	**0.25**	0.19	
179601-23-1	m,p-Xylenes	**3.9**	1.7	**0.89**	0.38	
95-47-6	o-Xylene	**1.4**	0.83	**0.32**	0.19	
98-82-8	Cumene	ND	0.83	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.83	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	**1.1**	0.83	**0.23**	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 40** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-017

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01243

Initial Pressure (psig): -0.40 Final Pressure (psig): 3.96

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	**1.6**	0.65	**0.43**	0.18	
107-06-2	1,2-Dichloroethane	ND	0.65	ND	0.16	
71-43-2	Benzene	**2.0**	0.65	**0.64**	0.20	
108-88-3	Toluene	**8.8**	0.65	**2.3**	0.17	
106-93-4	1,2-Dibromoethane	ND	0.65	ND	0.085	
100-41-4	Ethylbenzene	**1.4**	0.65	**0.33**	0.15	
179601-23-1	m,p-Xylenes	**5.4**	1.3	**1.2**	0.30	
95-47-6	o-Xylene	**1.8**	0.65	**0.42**	0.15	
98-82-8	Cumene	ND	0.65	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.65	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	**1.5**	0.65	**0.31**	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 41** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-018

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01218

Initial Pressure (psig): -3.00 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.79	ND	0.19	
71-43-2	Benzene	**1.8**	0.79	**0.55**	0.25	
108-88-3	Toluene	**9.0**	0.79	**2.4**	0.21	
106-93-4	1,2-Dibromoethane	ND	0.79	ND	0.10	
100-41-4	Ethylbenzene	**1.3**	0.79	**0.31**	0.18	
179601-23-1	m,p-Xylenes	**5.2**	1.6	**1.2**	0.36	
95-47-6	o-Xylene	**1.9**	0.79	**0.44**	0.18	
98-82-8	Cumene	ND	0.79	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	**1.1**	0.79	**0.22**	0.16	
95-63-6	1,2,4-Trimethylbenzene	**3.1**	0.79	**0.64**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 42** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-019

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01179

Initial Pressure (psig): -1.52 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.40

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.70	ND	0.19	
107-06-2	1,2-Dichloroethane	ND	0.70	ND	0.17	
71-43-2	Benzene	**1.7**	0.70	**0.53**	0.22	
108-88-3	Toluene	**8.2**	0.70	**2.2**	0.19	
106-93-4	1,2-Dibromoethane	ND	0.70	ND	0.091	
100-41-4	Ethylbenzene	**1.1**	0.70	**0.25**	0.16	
179601-23-1	m,p-Xylenes	**4.6**	1.4	**1.1**	0.32	
95-47-6	o-Xylene	**1.7**	0.70	**0.38**	0.16	
98-82-8	Cumene	ND	0.70	ND	0.14	
108-67-8	1,3,5-Trimethylbenzene	**0.87**	0.70	**0.18**	0.14	
95-63-6	1,2,4-Trimethylbenzene	**2.5**	0.70	**0.50**	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 43** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P1204494-020

Test Code: EPA TO-15 Date Collected: 10/25/12
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 10/31/12
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00870

Initial Pressure (psig): -3.27 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.62

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.81	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.81	ND	0.20	
71-43-2	Benzene	**1.2**	0.81	**0.37**	0.25	
108-88-3	Toluene	**10**	0.81	**2.7**	0.22	
106-93-4	1,2-Dibromoethane	ND	0.81	ND	0.11	
100-41-4	Ethylbenzene	ND	0.81	ND	0.19	
179601-23-1	m,p-Xylenes	**2.8**	1.6	**0.65**	0.37	
95-47-6	o-Xylene	**0.99**	0.81	**0.23**	0.19	
98-82-8	Cumene	ND	0.81	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.81	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**0.93**	0.81	**0.19**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 44**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-021

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC00993

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P121102-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/2/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P121105-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/5/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.50	ND	0.13	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
98-82-8	Cumene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

SURROGATE SPIKE RECOVERY RESULTS

Client: **Stantec Consulting Services, Inc.**
Client Project ID: **Sunoco IH Testing / 213402094** CAS Project ID: P1204494

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 10/25/12
Analyst: Lusine Hakobyan Date(s) Received: 10/31/12
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 11/2 - 11/5/12
Test Notes:

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P121102-MB	**101**	**99**	**96**	70-130	
Method Blank	P121105-MB	**102**	**100**	**97**	70-130	
Lab Control Sample	P121102-LCS	**99**	**99**	**100**	70-130	
Lab Control Sample	P121105-LCS	**99**	**100**	**99**	70-130	
Sample 23	P1204494-001	**101**	**101**	**95**	70-130	
Sample 25	P1204494-002	**101**	**101**	**95**	70-130	
Sample 26	P1204494-003	**101**	**101**	**97**	70-130	
Sample 27	P1204494-004	**102**	**100**	**97**	70-130	
Sample 28	P1204494-005	**101**	**100**	**96**	70-130	
Sample 29	P1204494-006	**101**	**100**	**97**	70-130	
Sample 30	P1204494-007	**101**	**100**	**97**	70-130	
Sample 31	P1204494-008	**101**	**99**	**96**	70-130	
Sample 32	P1204494-009	**102**	**99**	**97**	70-130	
Sample 33	P1204494-010	**101**	**99**	**97**	70-130	
Sample 34	P1204494-011	**102**	**100**	**97**	70-130	
Sample 35	P1204494-012	**101**	**100**	**97**	70-130	
Sample 36	P1204494-013	**100**	**101**	**97**	70-130	
Sample 37	P1204494-014	**100**	**101**	**97**	70-130	
Sample 38	P1204494-015	**99**	**100**	**98**	70-130	
Sample 39	P1204494-016	**101**	**100**	**98**	70-130	
Sample 40	P1204494-017	**101**	**100**	**97**	70-130	
Sample 40	P1204494-017DUP	**100**	**100**	**96**	70-130	
Sample 41	P1204494-018	**101**	**101**	**97**	70-130	
Sample 42	P1204494-019	**100**	**102**	**96**	70-130	
Sample 43	P1204494-020	**101**	**101**	**98**	70-130	
Sample 44	P1204494-021	**100**	**101**	**96**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P121102-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/02/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	CAS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	204	**187**	**92**	67-116	
107-06-2	1,2-Dichloroethane	208	**180**	**87**	70-118	
71-43-2	Benzene	208	**187**	**90**	66-121	
108-88-3	Toluene	208	**172**	**83**	67-111	
106-93-4	1,2-Dibromoethane	208	**182**	**88**	73-122	
100-41-4	Ethylbenzene	206	**170**	**83**	71-117	
179601-23-1	m,p-Xylenes	412	**328**	**80**	70-116	
95-47-6	o-Xylene	200	**163**	**82**	70-116	
98-82-8	Cumene	196	**160**	**82**	70-116	
108-67-8	1,3,5-Trimethylbenzene	208	**169**	**81**	71-121	
95-63-6	1,2,4-Trimethylbenzene	200	**165**	**83**	73-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1204494
Client Project ID: **Sunoco IH Testing / 213402094** CAS Sample ID: P121105-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/05/12
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	CAS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	204	**191**	**94**	67-116	
107-06-2	1,2-Dichloroethane	208	**184**	**88**	70-118	
71-43-2	Benzene	208	**190**	**91**	66-121	
108-88-3	Toluene	208	**178**	**86**	67-111	
106-93-4	1,2-Dibromoethane	208	**189**	**91**	73-122	
100-41-4	Ethylbenzene	206	**174**	**84**	71-117	
179601-23-1	m,p-Xylenes	412	**338**	**82**	70-116	
95-47-6	o-Xylene	200	**167**	**84**	70-116	
98-82-8	Cumene	196	**164**	**84**	70-116	
108-67-8	1,3,5-Trimethylbenzene	208	**173**	**83**	71-121	
95-63-6	1,2,4-Trimethylbenzene	200	**171**	**86**	73-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Stantec Consulting Services, Inc.**
Client Sample ID: **Sample 40**
Client Project ID: **Sunoco IH Testing / 213402094**

CAS Project ID: P1204494
CAS Sample ID: P1204494-017DUP

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01243

Date Collected: 10/25/12
Date Received: 10/31/12
Date Analyzed: 11/5/12
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.40 Final Pressure (psig): 3.96

Canister Dilution Factor: 1.30

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	Duplicate Sample Result ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Methyl tert-Butyl Ether	1.55	0.431	1.57	0.436	1.56	**1**	25	
1,2-Dichloroethane	ND	ND	ND	ND	-	-	25	
Benzene	2.03	0.637	2.03	0.634	2.03	**0**	25	
Toluene	8.79	2.33	8.75	2.32	8.77	**0.5**	25	
1,2-Dibromoethane	ND	ND	ND	ND	-	-	25	
Ethylbenzene	1.45	0.333	1.43	0.329	1.44	**1**	25	
m,p-Xylenes	5.39	1.24	5.35	1.23	5.37	**0.7**	25	
o-Xylene	1.83	0.422	1.82	0.419	1.825	**0.5**	25	
Cumene	ND	ND	ND	ND	-	-	25	
1,3,5-Trimethylbenzene	ND	ND	ND	ND	-	-	25	
1,2,4-Trimethylbenzene	1.54	0.314	1.53	0.311	1.535	**0.7**	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

APPENDIX H

Supplemental Site Characterization Report for Aboveground Storage Tanks PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885

SUPPLEMENTAL SITE CHARACTERIZATION REPORT ABOVEGROUND STORAGE TANKS PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885 AREA OF INTEREST 4

SUNOCO, INC. (R&M)
PHILADELPHIA ENERGY SOLUTIONS FACILITY
PHILADELPHIA, PENNSYLVANIA

Sunoco, Inc. (R&M)
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Prepared by:
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122 South Church Street
West Chester, PA 19382

October 16, 2013
2574601

SUPPLEMENTAL SITE CHARACTERIZATION REPORT
ABOVEGROUND STORAGE TANKS PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885
AREA OF INTEREST 4

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October 16, 2013

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1.0 INTRODUCTION

This Supplemental Site Characterization Report (SCR) has been prepared to document closure and/or corrective action activities completed for aboveground storage tanks (ASTs) PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885 within Area of Interest 4 (AOI 4) in the Philadelphia Energy Solutions Refining and Marketing LLC (PES) facility, herein referred to as facility. This Supplemental SCR is an attachment to the overall AOI 4 Site Characterization/Remedial Investigation Report (SCR/RIR) that is being submitted to the Pennsylvania Department of Environmental Protection (PADEP) and the Environmental Protection Agency (EPA) in accordance with PA One Cleanup Program. The purpose of the supplemental SCR is to document the status of each tank and to summarize the previous and more-recent supplemental closure and/or corrective action work completed by the previous owner Sunoco Inc. (R&M) (Sunoco) in these tank areas. All of this work has been completed pursuant to the requirements of 25 Pa Code Chapter 245. Where applicable, the more-recent supplemental investigation work considered other investigation work completed at the facility under the PA One Cleanup Program.

As referenced in the AOI 4 SCR/RIR, numerous ASTs were removed from AOI 4 prior to August 5, 1989. Conditions in tank areas where tanks were removed prior to August 5, 1989 are being characterized under the PA One Cleanup Program investigation and are discussed in the AOI 4 SCR/RIR. Five tanks in AOI 4 (PB 843, PB 844, PB 845, and PB 849) have been closed-in-place. Closure documentation and/or corrective action reports were previously prepared for these tanks. Six existing tanks, PB 826, PB 846, PB 847, PB 880, PB 881, and PB 885, have had previous releases. SCR's, prepared consistent with the requirements of 25 Pa. Code §245.310, were previously prepared for these release incidents. One tank in AOI 4 (PB 846) has been closed-in-place following a release. Closure documentation, and SCR and/or corrective action reports were previously prepared for this tank. Refer to Appendix A of this Supplemental SCR for previous correspondence between the PADEP and Sunoco and copies of reports submitted to DEP regarding these ASTs. Although tank PB 843 was closed-in-place by Sunoco in 2006, PES recently reactivated the tank and it is currently in use for crude oil storage. Refer to Appendix B for the PES documentation to the PADEP.

1.1 Objective

Since August 5, 1989, six ASTs in AOI 4 have had releases, and five have been closed-in-place. One of the release incidents is covered by the 2003 CO&A. These ASTs include:

- AST PB 826 – Existing - with release;
- AST PB 843 – Closed-in-place – no release;
- AST PB 844 – Closed-in-place – no release;
- AST PB 845 – Closed-in-place – no release;
- AST PB 846 – Existing - with release, and then closed-in-place;
- AST PB 847 – Existing - with release;
- AST PB 849 – Closed-in-place – no release;
- AST PB 880 – Existing - with release;
- AST PB 881 – Existing - with release; and
- AST PB 885 – Existing - with release.

The purpose of the Supplemental SCR is to document the status of each tank and to summarize the previous and recent supplemental closure and/or corrective action work completed by Sunoco in these tank areas.

1.2 Scope of Work Summary

This Supplemental SCR is focused on the work completed for AOI 4 ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885. No supplemental site characterization work was completed in the areas of ASTs PB 843, PB 844, PB 845, PB 846 and PB 849 because previous corrective action work completed by others was deemed approved by the PADEP and Corrective Action Program requirements were deemed to be fulfilled.

For AOI 4 ASTs PB 826, PB 847, PB 880, PB 881, and PB 885, additional site characterization activities were completed as part of the larger and more-recent AOI 4 site characterization effort to supplement previously-existing site characterization work

performed by others. These supplemental activities are described in this report relative to the tank areas, and in the AOI 4 SCR/RIR. Soil and groundwater samples were analyzed for the site constituents of concern (COCs) as provided in Table 1. The COCs for the investigation activities include the current constituents from the Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001 (as amended).

2.0 SITE LOCATION AND DESCRIPTION

The PES facility is located in southwest Philadelphia. AOI 4, also known as the #4 Tank Farm Area, is bordered by Hartranft Street to the North, 26th Street to the East, Penrose Avenue to the South, and AOI 3 to the West. The AOI encompasses approximately 90 acres. Currently, AOI 4 is comprised of primarily Crude Oil and Gas Oil ASTs. Numerous below ground pipelines are active within AOI 4; this is the largest storage area in the facility. The boundary of AOI 4 is shown in Figures 1 and 2. The locations of ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885 are shown in Figure 2.

2.1 Site Description

The PES 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 was established as an oil distribution center. In the 1900s, crude oil processing began and full-scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia, were also produced at the site for a time.

Historically, it was noted that the area was originally used for farming. Currently, AOI 4 is comprised of primarily crude oil and gas oil aboveground storage tanks (ASTs). Numerous below ground pipelines are active within AOI 4; this is the largest storage area in the facility. Several pump houses are also present in AOI 4. There are several areas in AOI 4 where roads and tank berms are covered by surfaces which prevent direct contact with site soils.

In 2008 a total fluids recovery system was installed along the border of Penrose Avenue, near the intersection of 26th Street. This system consists of 16 recovery wells arranged in two arrays running parallel to Penrose Avenue. The existing monitoring well network in AOI 4 includes a total of 47 shallow monitoring points: 14 shallow monitoring wells, 13 shallow/intermediate monitoring wells, one piezometer, and 19 recovery wells. Groundwater gauging of select monitoring wells in AOI 4 occurs on an annual basis during the second quarter of each year. Annual gauging activities and results are reported to the PADEP and EPA in Quarterly Reports prepared by Sunoco. Sunoco also samples select perimeter wells in AOI 4 on an annual basis. Refer to the AOI 4 SCR/RIR for more detail regarding AOI 4 groundwater monitoring wells.

2.2 Topography and Physiography

The overall facility and AOI 4 falls within the Atlantic Coastal Plain Physiographic Province which is generally low-lying and relatively flat. Northwest of the Facility, bedrock outcrops along the Fall Line (the line between the area where bedrock outcrops to the west and the Coastal Plain sediments lay to the east); near the site, bedrock is overlain with thick, unconsolidated deposits of layered sand and gravel, silts, and clays. These deposits are somewhat thin along the western portion of the Coastal Plain where bedrock is at shallower depths, and gradually thicken in a southeast direction to the coast, where these deposits are several thousand feet thick. Within the Facility, at the northwestern end of the Coastal Plain, existing boring information indicates the unconsolidated deposits to be generally less than 100 feet in thickness. Land surface topography at the Facility is relatively flat, with the land surface elevation being generally less than 30 feet above mean sea level. The flatness of the topography is representative of the Coastal Plain where alluvial sediments have been deposited by meandering streams and rivers with deposition ultimately controlled by the proximity to sea level. There are no significant areas of topographic relief within the Facility.

3.0 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology and Hydrogeology

The regional aquifers underlying the Philadelphia area and the Coastal Plain have been studied extensively by the USGS and State Agencies. Site specific geology and hydrogeology were determined from site specific borings and wells.

The geology of the facility is composed of several different units, which can be generally characterized as: filled land in many portions of the site, alluvium, unconsolidated sand, gravel, silt, and clay, which occur as layered and differentiated units, and bedrock. The following summary discussion presents a description of each of the geologic units at the site in terms of geologic history, lithology, and regional hydrogeology.

Wissahickon Formation - According to the American Institute of Professional Geologists mapping (Bennison, 1976), the oldest geologic unit underlying the site is the Wissahickon Formation of lower Cambrian age (540-570 million years). This formation is a metamorphosed micaceous schist and quartzite into which igneous bodies have intruded (Greenman, et al, 1961). The surface of the Wissahickon Formation was eroded by the paleo-Schuylkill River, which formed 4 channels (troughs) which fed the paleo-Delaware River. Greenman, et. al 1961, mapped the Point Breeze Trough within the PES facility. Work completed by CVM in 1985 reportedly verified the existence of this trough at the Facility.

The Wissahickon Formation is overlain by an extensive confining unit derived from the weathering of the bedrock. Near its top, the confining unit is predominately a micaceous, soft clay which grades downward, becoming increasingly sandy as the degree of weathering of the crystalline formation lessens and competent bedrock is reached. The clay layer acts as a confining layer to the water-bearing fractures of the Wissahickon Formation. Where the clay layer is present, the Wissahickon Formation behaves as an artesian aquifer, with flow generally to the southeast away from the Fall Line at a steep gradient.

Lower Sand Unit of the PRM - At the Facility, the Wissahickon Formation is overlain by the Lower Sand, which is the lowest member of the Potomac-Raritan Magothy System (upper Cretaceous age; 65 to 98 million years). The Lower Sand is a fine gravel and course sand that grades upward into medium to fine sands and contains a few layers of clay (Greenman and others, 1961). The Lower Sand is yellowish gray to yellowish brown in color and is generally overlain by the Lower and Middle Clay.

Middle/Lower Clay - The Middle Clay member of the Raritan Formation is the most extensive clay layer in the Philadelphia area. Regionally, the thickness of the Middle Clay ranges from 0 to 60 feet, with thicknesses commonly greater than 20 feet. The Middle and Lower Clay units appear to become one unit beneath the facility and therefore it is called the Middle/Lower Clay in this document, whereas this unit has been referred to as the Middle Clay or Lower Clay in historical reports. The Middle/Lower Clay is characterized by a very low permeability and forms an effective barrier to groundwater flow.

Trenton Gravels - The Trenton Gravel 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).

Recent Alluvium - Overlying the Trenton Gravels Formation is recent alluvium with depths up to 78 feet. These deposits generally consist of dark gray organic clayey mud or silt and fine sand. The recent alluvium is unimportant as a water source because it is significantly less permeable that the subjacent aquifers. The alluvium acts, however, as a leaky confining bed, impeding flow of groundwater to the lower aquifers. Where it overlies the Trenton Gravels, the recent alluvium may cause the Trenton Gravel to respond as an artesian aquifer. The primary hydrologic features in the vicinity of the site include the Schuylkill and Delaware Rivers. Groundwater flow in the fill/alluvium and in the Trenton Gravel is generally toward the south-southwest toward the Schuylkill River, however, there is south-southeast component of flow toward the confluence of the Delaware and Schuylkill Rivers.

3.2 Site Specific Geology and Hydrogeology

Geologic unit descriptions are provided in Section 3.1 above and a geologic cross-section plan is provided in Figure 3. The following summarizes relevant information concerning geology and hydrogeology in AOI 4.

- The Fill/Alluvium, Trenton Gravel, Middle/Lower Clay, and the Lower Sand units all exist beneath AOI 4;
- The thickness of the Fill/Alluvium materials beneath AOI 4 ranges between 5-15 feet;
- The thickness of the Trenton Gravel beneath AOI 4 ranges between 15-45 feet;
- The thickness of the discontinuous Middle/Lower Clay at the eastern border of AOI 4 is approximately 2-20 feet;
- The thickness of the Lower Sand beneath AOI 4 is approximately 15-45 feet;
- The groundwater gradient in the central portion of AOI 4 is relatively flat;
- There appears to be a groundwater divide located in the center of AOI 4 from which groundwater flow is to the northwest, east, and to the south;
- Groundwater flow in the most southeastern portion of AOI 4 is influenced by the total fluids pumping at the Penrose Recovery System.

For a more detailed description of the geology and hydrology related to AOI 4, refer to the AOI 4 SCR/RIR.

4.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIATION EFFORTS

This section summarizes previous site assessment/characterizations and corrective action work completed for AOI 4 ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885.

4.1 AST PB-826

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release of approximately 48 gallons of crude oil that occurred July 13, 2004. Remedial activities and cleanup was initiated immediately using vacuum trucks to remove the oil water mixture that had leaked into the tank berm as well as stained surface soils. The PADEP was notified July 26, 2004 of the release and associated remedial activities.

As summarized in a Secor International, Inc. (SECOR) report dated January 5, 2005 (provided in Appendix A), SECOR collected nine soil samples to verify the effectiveness of remedial activities. The SECOR soil sampling locations are displayed on Figure 6. The soil samples were collected at a depth of approximately 0.5 feet below ground surface (bgs) and analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead). None of the soil samples exceeded the Non-residential Surface Soil and Subsurface Soil Direct Contact Medium Specific Concentrations (MSCs) or Used Aquifer Nonresidential Soil-to-Groundwater MSCs. Therefore, no further action in response to this release incident was recommended by the PADEP in a letter dated March 7, 2005.

Historical soil sample analytical results from SECOR's 2005 report are provided in Table 2 and displayed on Figure 6. Refer to Appendix A for additional information regarding the previous investigation.

4.2 AST PB-843

Sunoco conducted confirmatory sampling activities for the closure-in-place of AST PB 843 that historically contained recovered fuel oil and is a 150-foot diameter AST. A PADEP Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on July 21, 2006 by Sunoco. As summarized in a SECOR report dated March 12, 2007 (provided in Appendix A), soil samples from both the perimeter of the AST and from below the AST were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter as agreed upon between SECOR and the PADEP. An Alternative Confirmatory Sampling Plan was submitted to

the PADEP on March 16, 2006, and approved by the PADEP on April 5, 2006. In accordance with this alternative plan, SECOR then conducted site assessment activities on August 23, 2006, by collecting six perimeter soil samples and three angled soil samples. Nine soil samples were also collected from the vicinity of two underground pipelines and one aboveground pipeline at AST PB 843. A truck-mounted Geoprobe was utilized for advancement of all of the soil borings. All of the soil sample locations are displayed on Figure 7. The six perimeter soil samples were collected from approximately 3 bgs while the three angled soil samples were collected from approximately 5 feet bgs. Six subsurface soil samples within the vicinity of the two underground pipelines were collected from approximately 5.5 to 6 feet bgs. Three surface soil samples were collected from directly beneath the aboveground pipeline from approximately 0 to 0.5 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead).

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs. SECOR, therefore, recommended no further action in regard to the closure-in-place of AST PB 843.

Historical soil sample analytical results from SECOR's 2007 report are provided in Tables 2 and 3. The soil sampling locations are displayed on Figure 7. Refer to Appendix A for additional information regarding the previous investigation.

4.3 AST PB-844

Sunoco conducted confirmatory sampling activities for the closure-in-place of AST PB 844 that historically contained recovered crude oil and is a 150-foot diameter AST. A PADEP Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on July 21, 2006 by Sunoco. As summarized in a SECOR report dated January 7, 2008 (provided in Appendix A), soil samples from both the perimeter of the AST and from below the AST were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter as agreed upon between SECOR and the PADEP. An Alternative Confirmatory Sampling Plan was submitted to

the PADEP on March 16, 2006, and approved by the PADEP on April 5, 2006. In accordance with this alternative plan, SECOR conducted site assessment activities on August 23, 2006, by collecting six perimeter soil samples and three angled soil samples. Ten soil samples were also collected from the vicinity of three underground pipelines at AST PB 844. A truck-mounted Geoprobe was utilized for advancement of all of the soil borings. The SECOR soil sampling locations are displayed on Figure 7. The six perimeter soil samples were collected from approximately 3 bgs while the three angled soil samples were collected from approximately 5 feet bgs. Ten subsurface soil samples within the vicinity of the three underground pipelines were collected from approximately 5.5 to 6 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead).

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. No soil samples exceeded for the Used Aquifer Nonresidential Soil to Groundwater MSCs, except for benzene in soil sample AST-844-Line-10 that had a reported concentration of 2,400 micrograms per kilogram (ug/Kg). This sample appeared to be isolated because surrounding soil samples had benzene concentrations that were either non-detect or detected at very low levels.

Historical soil sample analytical results from SECOR's 2008 report are provided in Tables 1 and 2. The soil sampling locations are displayed on Figure 7. Refer to Appendix A for additional information regarding the previous investigation.

4.4 AST PB-845

Sunoco conducted confirmatory sampling activities for the closure of AST PB 845 that historically contained crude oil and is a 150-foot diameter AST. A PADEP Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by Sunoco. As summarized in a SECOR report dated February 28, 2008 (provided in Appendix A), soil samples from both the perimeter of the AST and from below the AST were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter as agreed upon between SECOR and the PADEP. An Alternative Confirmatory Sampling Plan was submitted to the PADEP on

March 16, 2006, and approved by the PADEP on April 5, 2006. In accordance with this alternative plan, SECOR conducted site assessment activities on August 24, 2006, by collecting six perimeter soil samples and three angled soil samples. A truck-mounted Geoprobe was utilized for advancement of these of the nine soil borings. Six soil samples were also collected from below an aboveground pipeline at AST PB 845. The SECOR soil sampling locations are displayed on Figure 8. The six perimeter soil samples were collected from approximately 3 bgs while the three angled soil samples were collected from approximately 5 feet bgs. The six soil samples within the vicinity of the aboveground pipeline were collected from approximately 0 to 0.5 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead).

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs so no further action was recommended for the closure-in-place for AST PB 845.

Historical soil sample analytical results from SECOR's 2008 report are provided in Tables 2 and 3 and the soil sampling locations are displayed on Figure 8. Refer to Appendix A for additional information regarding the previous investigation.

4.5 AST PB-846

The AOI 4 AST PB 846 had a reported product release in May 2002 that resulted in Sunoco conducting site assessment activities on May 28 and 29, 2003. These assessment activities were documented in a site assessment report dated July 22, 2003, and then revised in a site assessment report January 20, 2004. Sunoco also conducted confirmatory sampling in August of 2006 for closure of AST PB 846. The remainder of this section summarizes the revised site assessment report dated January 20, 2004, and the tank closure report dated December 5, 2007.

<u>Previous Release</u>

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release that occurred during May 2002 in the

area of AST PB 846 that resulted in visibly stained surface soils within the tank containment dike.

A SECOR site assessment report dated January 20, 2004, summarizes the site assessment activities conducted to evaluate the vertical and lateral extent of impacted soils from the May 2002 release (provided in Appendix A). Prior to the site assessment activities, a shallow trench was excavated around the perimeter of AST PB 846 in order to collect the released product. Twelve soil borings were then advanced on May 28 and 29, 2003, and 25 soil samples were collected from the borings. A truck-mounted Geoprobe was utilized for advancement of the soil borings. Twenty-four of the soil samples were collected from approximately 0 to 2.0 feet bgs. Also, one surface soil sample was collected from approximately 0.3 feet bgs but within the area stained soil surrounding AST PB 846. Temporary well points were installed at boring locations MW-1, MW-3, and MW-4 (well construction details are presented in Appendix A). The SECOR soil sampling and temporary well point locations are displayed on Figure 2 of the SECOR report within Appendix A.

No soil samples exceeded Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. Twelve of 25 samples did not exceed the Used Aquifer Nonresidential Soil-to-Groundwater MSCs. Thirteen of the 25 had exceedances for chemicals of concern including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, naphthalene, pyrene. These exceedances were for all surface soil samples. It was determined that the exceedances may be associated with the fill material in the tank berm area, due to exceedances found in areas which appear to be unaffected by the May 2002 release. LNAPL was detected at a thickness of 0.89 feet in MW-3. This LNAPL is thought to be associated with the existing LNAPL plume unrelated to AST 846 because the soil samples collected directly above the water table were below the Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Historical soil sample analytical results from SECOR's 2004 report are provided in Appendix A. Refer to Appendix A for any additional information regarding the previous investigation.

Closed-In-Place

Sunoco conducted confirmatory sampling activities for the closure of AST PB 846 that historically contained crude oil and is a 150-foot diameter AST. A PADEP Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by Sunoco. As summarized in a SECOR report dated December 5, 2007 (provided in Appendix A), soil samples from both the perimeter of the AST and from below the AST were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter as agreed upon between SECOR and the PADEP. An Alternative Confirmatory Sampling Plan was submitted to the PADEP on March 16, 2006, and approved by the PADEP on April 5, 2006. In accordance with this alternative plan, SECOR conducted site assessment activities on August 24, 2006, by collecting six perimeter soil samples and three angled soil samples. Seven soil samples were also collected from the vicinity of three underground pipelines at AST PB 846. A truck-mounted Geoprobe was utilized for advancement of the soil borings. The SECOR soil sampling locations are displayed on Figure 8. The six perimeter soil samples were collected from approximately 3 bgs while the three angled soil samples were collected from approximately 5 feet bgs. The seven soil samples within the vicinity of the aboveground pipeline were collected from approximately 5.5 to 6 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead).

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs so no further action was recommended for the closure-in-place for AST PB 846.

Historical soil sample analytical results from SECOR's 2007 report are provided in Table 3. The soil sampling locations are displayed on Figure 8. Refer to Appendix A for additional information regarding the previous investigation.

4.6 AST PB-847

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release of crude oil within the dike area for

AST PB 847 on September 3, 2006. After the release, remedial activities and cleanup was initiated by Sunoco which included the excavation of surface soils to a depth of approximately 4-inches bgs in the area of the release. Site assessment activities were conducted to evaluate if additional actions were necessary.

As reported in the January 25, 2007 letter (Appendix A), SECOR conducted soil sampling activities on October 16, 2006, by collecting six shallow soil samples from within the area of the crude oil release. The SECOR soil sampling locations are displayed on Figure 9. The six soil samples were collected from approximately 0 to 0.5 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and waste oil (including total xylenes).

No soil samples exceeded the Nonresidential Surface Soil Direct Contract MSCs, Nonresidential Subsurface Soil Direct Contact MSCs, or the Used Aquifer Nonresidential Soil-to-Groundwater MSCs. The results indicate that the interim remedial activities were sufficient; therefore no additional remedial activities are necessary.

Historical soil sample analytical results from SECOR's 2007 report are provided in Tables 2 and 3. The soil sampling locations are displayed on Figure 9. Refer to Appendix A for additional information regarding the previous investigation.

4.7 AST PB-849

Sunoco conducted confirmatory sampling activities for the closure of AST PB 849 that historically contained recovered oil and is a 48-foot diameter AST. A PADEP Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by Sunoco. As summarized in a SECOR report dated January 7, 2008 (provided in Appendix A), soil samples from both the perimeter of the AST and from below the AST were collected in accordance with the PADEP Closure Requirements for ASTs that are greater than 25 feet and less than 60 feet in diameter. SECOR conducted site assessment activities on May 25, 2007, collecting a total of five perimeter soil samples and one soil sample from below the AST. A truck-mounted Geoprobe was utilized for advancement of these six soil borings. Four soil samples

were also collected from below aboveground pipelines at AST PB 849. A hand auger was utilized for advancement of these four soil borings. The SECOR soil sampling locations are displayed on Figure 10. The five perimeter soil samples were collected from approximately 3 bgs while the soil sample collected from beneath the AST was collected from a depth of approximately 5 feet bgs. The four soil samples from below the aboveground pipelines were collected from approximately 0 to 0.5 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil (except lead).

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs so no further action was recommended for the closure-in-place for AST PB 849.

Historical soil analytical results are provided in Tables 2 and 3. The soil sampling locations are displayed on Figure 10. Refer to Appendix A for additional information regarding the previous investigation.

4.8 ASTs PB 880 and PB 881

The AOI 4 ASTs PB 880 and PB 881 had a reported product release in April of 2004 within their shared dike system. Sunoco conducted assessment activities that were documented in a site assessment report dated October 6, 2004. Sunoco also conducted assessment activities for a reported release associated with AST PB 881 in October of 2005 in a site assessment report dated December 21, 2005. The remainder of this section summarizes these separate site assessment reports.

<u>2004 Release</u>

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release approximately 233,940 gallons of crude oil April 4, 2004, to the ground surface within the AST PB 880 tank dike area. The crude oil was released from a welded section next to a shoe support on the 300-inch lateral line to AST PB 850 that runs through the AST PB 880 tank dike area. Because the AST PB 880 and AST PB 881 tank dike drains are linked and share a common shear

gate, the crude oil flowed into a drainage grate in the AST PB 880 tank dike area then into the drainage grate in the adjoining AST PB 881 tank dike area. The AST PB 850 tank manifold was secured and vacuum trucks used to remove the crude oil before processing. Approximately 279 tons of impacted soil was excavated and disposed of and Sunoco notified the PADEP of the incident and remedial activities in a letter dated April 16, 2004.

As summarized in the October 6 ,2004 report (Appendix A), SECOR collected 14 soil samples from within the AST PB 880 tank dike area and seven soil samples from within the AST PB 881 tank dike area to confirm the interim remedial measures related to the crude oil release were successful. The soil samples from the AST PB 880 tank dike area were collected on three separate occasions (April 8, April 21, and September 7, 2004). The soil samples from the AST PB 881 tank dike area were collected on July 22, 2004. The SECOR soil sampling locations are displayed on Figure 11. Twenty of the soil samples were collected at approximately 0.5 feet bgs within the impacted soil release area while one of the soil samples was collected outside of the release area at approximately 0.5 feet bgs. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil.

Sixteen soil samples did not exceed the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or the Nonresidential Used Aquifer Soil-to-Groundwater MSCs. Four soil samples (880-8, 880-9, 880-11, and 880-13) exceeded the Nonresidential, Used Aquifer, Soil-to-Groundwater MSC of 500 ug/kg for benzene. Sample 881-5 exceeded the Nonresidential, Used Aquifer, Soil-to-Groundwater MSC of 25,000 ug/kg for naphthalene, but did not exceed the Nonresidential, Used Aquifer MSC for naphthalene in groundwater using EPA Method 8310 for SPLP naphthalene.

Vadose zone transport modeling was completed to evaluate the potential for benzene to reach the groundwater at concentrations exceeding applicable groundwater PADEP MSC. Details of the model parameters can be found in the October 6, 2004 SECOR Report and an electronic mail correspondence (Appendix A). The vadose zone modeling indicated that the soil exceedances would not impact groundwater above PADEP

MSCs. Sunoco indicated that the subsurface impacts in the area of AST PB 880 and AST PB 881 will be managed though other facility-wide programs.

Historical soil analytical results are provided in Table 2. The soil sampling locations are displayed on Figure 11. Refer to Appendix A for additional information regarding the previous investigation.

2005 Release

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release of approximately 252 gallons of crude oil on September 3, 2005, to the ground surface within the AST PB 881 tank berm through a leak in the east side of the tank floor. Sunoco used a vacuum truck to remove released crude oil and excavated impacted soils for disposal. The PADEP was notified of the incident and remedial activities in a letter dated September 13, 2005. As summarized in the SECOR December 21, 2005, SECOR report (Appendix A), six soil samples were collected to verify that the impacted material was removed. Five of the soil samples were collected at approximately 0.5 feet bgs within the impacted soil release area while one of the soil samples was collected outside of the release area at approximately 0.5 feet bgs. The SECOR soil sampling locations are displayed on Figure 11. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and used motor oil.

None of the soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to Groundwater MSCs, therefore no further remedial action is recommended.

Historical soil analytical results are provided in Table 2. The soil sampling locations are displayed on Figure 11. Refer to Appendix A for additional information regarding the previous investigation.

4.9 AST PB-885

Sunoco conducted previous interim remedial measures pursuant to the Corrective Action Program in response to a reported release of crude oil within the dike area for tank PB 885. After the release, remedial activities and cleanup was initiated by Sunoco which included the excavation of surface soils in the area of the release. Site assessment activities were conducted to evaluate if additional actions were necessary.

As summarized in the April 9, 2007 SECOR report (provided in Appendix A), 27 soil samples were collected on November 30, 2006 and March 14, 2007 sampling events. SECOR collected 12 of the 27 soil samples on November 30, 2006, and 15 of the soil samples were collected on March 14, 2007. All of the soil samples were collected from approximately 0 to 0.5 feet bgs. The SECOR soil sampling locations are displayed on Figure 12. All of the soil samples were analyzed for the Act 2 short-list for Fuel Oil Numbers 4, 5, and 6 and waste oil (including total xylenes).

Results of the November 2006 soil sampling event concluded that no soil samples exceeded the Nonresidential Surface Soil Direct Contact MSCs or the Nonresidential Subsurface Soil Direct Contact MSCs. Only one sample, AST-885-SS-6, exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs with a benzene concentration of 2,600 ug/kg. Therefore, the remedial activities were deemed effective.

In March 2007, 15 additional soil sample locations were randomly selected to verify the effectiveness of the previous interim remedial activities. A statistical soil sampling protocol was used to identify the amount and location of the 15 additional soil samples. All of the March 2007 soil samples were below the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs, with the exception of one sample. AST-885-CS-2 exceeded the 500 ug/kg benzene MSC with a concentration of 550 ug/kg. Because attainment was shown, no further remedial activities were deemed necessary by SECOR.

Historical soil analytical results are provided in Tables 2 and 3. The soil sampling locations are displayed on Figure 12. Refer to Appendix A for additional information regarding the previous investigation.

5.0 SUPPLEMENTAL SOIL SAMPLING ACTIVITIES

The following sections summarize the recent additional site characterization activities completed by Langan in AOI 4 to supplement previously-completed work at ASTs PB 826, PB 847, PB 880, PB 881, and PB 885. All soil samples were analyzed for the site COCs as provided in Table 1. Field work standard operating procedures (SOPs) used for the supplement work are provided as attachments to the AOI 4 SCR/RIR. For additional detail of the AOI-wide site characterization activities completed, refer to the AOI 4 SCR/RIR.

5.1 AST PB 826

The soil characterization activities for AST PB 826 included the advancement of one soil boring in the tank dike area and collection of a soil sample for laboratory analysis of COCs. A subsurface soil sample was collected at the soil boring location at a depth ranging between 4 to 6 feet bgs to further characterize soil within the tank berm. The Langan soil boring/sample location is displayed on Figure 6. LNAPL was not encountered within the soil boring location.

5.2 AST PB 847

Supplemental soil characterization activities for AST PB 847 included advancement of two soil borings in the former tank area and collection of four soil samples for laboratory analysis of COCs. The purpose of these samples was to further characterize shallow soils and initially investigate and characterize deep soils. Soil samples were collected at each soil boring location at depths between 0 feet and 9.5 feet bgs. A surface and subsurface soil sample were collected from each of the soil borings. LNAPL was not encountered at any of the soil boring locations. The Langan soil boring/sample locations are displayed on Figure 9.

5.3 ASTs PB 880 and PB 881

Supplemental soil characterization activities for ASTs PB 880 and PB 881 were completed to characterize and delineate soils in conjunction with the tank assessment. Soil samples were collected at four soil boring locations and sent for laboratory COC analysis. One surface soil sample was obtained from approximately 0 to 2 feet bgs and five subsurface soil samples were collected from the soil borings between approximately 2 and 6 feet bgs. LNAPL was not encountered at any of the soil boring locations. The Langan soil boring/sample locations are displayed on Figure 11.

5.4 AST PB 885

Seven soil borings were advanced to characterize and delineate soils in conjunction with the previous tank for AST PB 885. Soil samples were collected at each soil boring location at depths between approximately 0 to 10 feet bgs. Two surface and seven subsurface soil samples were collected from the soil borings and sent for laboratory COC analysis. LNAPL was not encountered at any of the soil boring locations. The Langan soil boring/sample locations are displayed on Figure 12.

6.0 SUPPLEMENTAL SOIL SAMPLING RESULTS

6.1 AST PB 826

The soil sample results for AST PB 826 included soil samples AOI4-S-373_4-6'. Analytical results are displayed in Table 3 and Figure 6. Exceedances for benzene of the PADEP non-residential MSC were exhibited in the subsurface soil sample at 1.25 milligrams/kilogram (mg/kg). There were no other exceedances of PADEP non-residential MSCs.

6.2 AST PB 847

The soil sample results for AST PB 847 included soil samples AOI4-BH-13-97_0-1_31413, AOI4-BH-13-97_8.5-9.5_31413, AOI4-BH-13-98_1-2_31413, and AOI4-BH-13-

98_6-7_31413. Analytical results are displayed in Tables 2 and 3 and Figure 9. Of the four samples collected, there were no exceedances of PADEP non-residential MSCs.

6.3 ASTs PB 880 and PB 881

The soil sample results for ASTs PB 880 and PB 881 included soil samples AOI4-BH-13-84_5.5-6_031513, AOI4-BH-13-85_5.5-6_031513, AOI4-BH-13-86_5.5-6-031513, AOI4-BH-13-88_1.5-2_031413, AOI4-BH-13-88_3.5-4_031413, and AOI4-BH-13-88_5.5-6_031413. Analytical results are displayed in Tables 2 & 3 and Figure 11. Exceedances for lead of the PADEP non-residential MSC were exhibited in the subsurface soil in AOI4-BH-13-86_5.5-6-031513 at 2,140 mg/kg at an approximate depth of 5.5-6 feet bgs. There were no other exceedances of PADEP non-residential MSCs.

6.4 ASTs PB 885

The soil sample results for AST PB 885 included soil samples BH-13-89, AOI4-BH-13-90_8-10_031513, AOI4-BH-13-91_0-2_031413, AOI4-BH-13-91_8-10_031413, AOI4-BH-13-92_8-10, AOI4-BH-13-93_8-10, AOI4-BH-13-94_0-2_031513, AOI4-BH-13-94_8-10_031513, and AOI4-BH-13-95_8-10. Analytical results are displayed in Tables 2 and 3 and Figure 12. There were no exceedances of PADEP non-residential MSCs.

7.0 LNAPL CHARACTERIZATION

Previous site characterization activities and reports have included LNAPL investigations and results that have allowed for the detection of separate LNAPL plumes within the subsurface of AOI 4. The results have assisted with the calculations of LNAPL specific volume and mobility. More detailed information for the LNAPL investigations, results, and conclusions are presented in the AOI 4 SCR/RIR. Below is a summary of major conclusions regarding the results of the LNAPL characterization and modeling from the AOI 4 SCR/RIR:

- Three LNAPL types or mixtures have been identified in AOI 4 (gasoline/middle distillate mixture, middle distillate, and middle distillate/light-end feedstock). The apparent thicknesses for each LNAPL plume in AOI 4 are provided in Figure 11.

- Previous LNAPL modeling performed in AOI 4 for the CCR and the 2005 SCR indicated the only areas of LNAPL mobility are located in the center and western side of AOI 4 and pose little risk of migrating off site.
- The majority of the wells with high LNAPL mobility are located in the southern portion of AOI 4. LNAPL mobility in these wells does not pose a risk to offsite receptors as the Penrose Recovery System is actively capturing the LNAPL in this area and preventing the migration of LNAPL.
- S-282 and S-365 are located along the western border of AOI 4 and the LNAPL in these wells does not pose a risk for migration offsite.
- S-369 is located on the eastern boundary of AOI 4 and has LNAPL with potential to extend offsite.

LNAPL and other groundwater conditions in AOI 4 are illustrated in Figure 5. Based on the location of LNAPL in AOI 4, and the LNAPL types, the following can be concluded with regard to ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885:

<u>PB 826</u>

- An isolated middle distillate plume exists in the vicinity of PB 826 within monitoring well S-123; however PB 826 was used to store crude oil.

<u>PB 843 and PB 844</u>

- Wells in the vicinity of PB 843 and PB 844 do not contain LNAPL.

<u>PB 845 and PB 846</u>

- Wells in the vicinity of PB 845 and PB 846 do not contain LNAPL.

<u>PB 847</u>

- Two isolated middle distillate plumes exist in the vicinity of PB 847 within monitoring wells S-32 and S-35; however PB 827 was used to store crude oil.

PB 849

- Wells in the vicinity of PB 849 do not contain LNAPL.

PB 880 and PB 881

- Wells in the vicinity of PB 880 and PB 881 do not contain LNAPL.

PB 885

- Wells in the vicinity of PB 885 do not contain LNAPL.

8.0 SUPPLEMENTAL GROUNDWATER INVESTIGATION

The groundwater monitoring well network in AOI 4 includes 47 monitoring points. Groundwater gauging of select monitoring wells in AOI 4 occurs on an annual basis during the second quarter of each year. Annual gauging activities and results are reported to the PADEP and EPA in Quarterly Reports prepared by Sunoco. Sunoco also samples select perimeter wells in AOI 4 on an annual basis. Refer to the AOI 4 SCR/RIR for more detail regarding AOI 4 groundwater monitoring wells, gauging, aquifer testing, groundwater sampling and groundwater analytical results. Monitoring well and environmental groundwater sampling SOPs are provided as attachments to the SCR/RIR.

The most-recent groundwater gauging and sampling of all accessible wells in AOI 4 was completed as part of the AOI 4 SCR/RIR characterization work during May and June 2013. The groundwater conditions, as measured during these events, are illustrated in Figure 5. The following sections discuss groundwater conditions in the vicinity of ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885 based on these groundwater monitoring events:

8.1 AST PB 826

In the area of AST PB 826, the shallow groundwater flow in the fill/alluvium is towards a hydraulic low or sink that is southeast of the AST as shown in Figure 5. The nearest well to AST PB 826 that had reported historical exceedance (lead) above the PADEP

non-residential groundwater MSCs is S-97, which is upgradient of AST PB 826. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.2 ASTs PB 843 and PB 844

In the area of ASTs PB 843 and PB 844, the shallow groundwater flow in the fill/alluvium is towards a hydraulic low southwest of the ASTs as shown in Figure 5. The nearest well to ASTs PB 843 and PB 844 that had reported historical exceedance (VOCs) above the PADEP non-residential groundwater MSCs is S-216, which is slightly upgradient of AST PB 844. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.3 ASTs PB 845 and PB 846

The shallow groundwater flow in the fill/alluvium in the area of ASTs PB 845 and PB 846 is towards the north/northeast as shown in Figure 5. The nearest well to ASTs PB 845 and PB 846 that had reported historical exceedance (VOCs and SVOCs) above the PADEP non-residential groundwater MSCs is MW-4, which is located within a hydraulic low as is AST PB 846. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.4 AST PB 847

In the area of AST PB 847, the shallow groundwater flow in the fill/alluvium is slightly to the north as shown in Figure 5. The nearest well to AST PB 847 that had reported historical exceedance (VOCs) above the PADEP non-residential groundwater MSCs is S-218, which is located slightly upgradient of AST PB 847 in a generally flat hydraulic area. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.5 AST PB 849

The shallow groundwater in the fill/alluvium in the area of AST PB 849 is towards the west/northwest as shown in Figure 5. The nearest well to AST PB 849 that had

reported historical exceedance (VOCs) above the PADEP non-residential groundwater MSCs is S-216, which is located downgradient of AST PB 849. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.6 AST PB 880 and PB 881

In the area of ASTs PB 880 and PB 881, the shallow groundwater flow in the fill/alluvium is generally flat to slightly easterly as shown in Figure 5. The nearest well to ASTs PB 880 and PB 881 that had reported historical exceedance (VOCs) above the PADEP non-residential groundwater MSCs is S-379, which is located slightly downgradient of ASTs PB 880 and PB 881. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

8.7 AST PB 885

The shallow groundwater in the fill/alluvium in the area of AST PB 885 is generally a flat hydraulic area as shown in Figure 5. The nearest well to AST PB 885 that had reported historical exceedance (VOCs) above the PADEP non-residential groundwater MSCs is S-97, which is located slightly downgradient of AST PB 885 in the flat hydraulic area. Refer to Figure 5 and the AOI 4 SCR/RIR for further information on AOI-wide groundwater conditions.

9.0 FATE AND TRANSPORT ANALYSIS

The results of previous characterization work completed in response to release assessments for ASTs in AOI 4 were incorporated into the fate and transport analysis for the AOI 4 SCR/RIR. Please refer to Section 7.0 of the AOI 4 SCR/RIR for detailed information about the analysis. Based on the fate and transport evaluation performed for AOI 4, potential off-site migration of dissolved COCs in groundwater above the MSCs does exist in the southeastern portion of AOI 4; however, the Penrose Recovery System serves as an engineering control to prevent the migration of impacted groundwater/LNAPL off-site in this area. No other areas exhibit the potential for off-site migration of dissolved COCs in groundwater.

10.0 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 shallow soils (0-2 feet bgs) or deep soils (2-15 feet bgs). Potential human health exposures for the Refinery are for an industrial worker scenario.

Direct contact exposure pathways to shallow soil, groundwater, and LNAPL is being evaluated under the industrial use scenario because PES has well-documented standards for PPE and procedures for soil excavation and handling.

The following table serves to summarize potential pathways that can be reasonably expected under the current and intended future non-residential use for AOI 4. The table lists potentially contaminated media, potential receptors for these media, and a summary of whether any potential pathways exist at the site from the media to these receptors.

Potential for Complete Exposure Pathways

Contaminated Media	Residents	Workers	DayCare	Construction	Trespassers	Recreation	Food
Groundwater	NA	No(1)	NA	No (3)	No	NA	NA
Air (indoor)	NA	No	NA	No	No	NA	NA
Soil <2 feet bgs.	NA	No	NA	No	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 (4)	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 pathway for site soil > 2 feet deep due to on-site procedures and PPE.
(3) No complete groundwater or LNAPL pathway exists for construction workers due to PPE requirements and Standard Operating Procedures.
(4) No complete pathway exists for site soil > 2 feet deep due to PPE requirements and Standard Operating Procedures.

Na - Not applicable.
No - No potential complete exposure pathway
Yes – Potential complete exposure pathway

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

10.1 Surface Water /Sediment

There are no surface water features located within AOI 4. The nearest surface water body to AOI 4 is the Schuylkill River which is located approximately 1,200 feet west of AOI 4. AOI 3 lies between the Schuylkill River and AOI 4 (Figure 1).

Based on the distance of AOI 4 from the Schuylkill River, groundwater flow, and the results of the groundwater modeling for monitoring wells where groundwater COCs were detected above the PADEP non-residential groundwater MSCs, none of the constituents detected in groundwater are likely to cause an in-stream violation of surface water quality criteria for the Schuylkill River.

10.2 Soils (0-15 Feet Below Grade)

Direct Contact Exposure

Based on the data collected between 2004 and 2013, concentrations of benzene, lead, naphthalene, toluene, and ethylene dibromide were detected in shallow soils above the non-residential soil MSC and concentrations of benzene, lead, naphthalene, ethylbenzene, ethylene dibromide, 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-trimethylbenzene (1,3,5-TMB) were detected in deep soils above the non-residential soil MSC. To refine the list of compounds carried forward in the risk assessment, the compounds listed above were further screened against the EPA Region III Risk-Based Concentrations (aka, EPA Regional Screening Levels [RSLs]) in accordance with Section IV of the PADEP's Technical Guidance Manual (TGM) (dated June 8, 2002). Based on this screening, concentrations of 1,3,5-TMB, 1,2,4-TMB, toluene, ethylene dibromide and ethylbenzene were below the EPA RSLs for industrial soil and were, therefore, eliminated from the risk assessment. Concentrations of benzene, lead and naphthalene were above the EPA RSLs and were, therefore, further evaluated as outlined in the January 2013 Soil Screening Procedure for Philadelphia Energy Solutions memorandum (Sunoco 2013).

As described in the January 2013 memorandum, the compounds that exceeded both the non-residential statewide health standards and EPA RSLs were compared to the PADEP's Non-Residential Direct Contact MSC. To maintain conservatism, all soil samples (surface and subsurface) were screened against the more stringent 0-2 feet below grade direct contact criteria regardless of sample depth in the event that soils are re-used elsewhere on the Facility. Based on this screening, concentrations of benzene and naphthalene were eliminated from the risk assessment. The analyte identified for further risk assessment is lead. Since most lead-based human health effects data are based on blood-lead concentrations instead of external dose, the traditional approach for risk assessment is not applied to characterize exposure to lead.

The site-specific screening level for lead was calculated based on ingestion as presented in 25 Pa. Code § 250.306(e), Appendix A, Table 7. As described in 25 Pa. Code § 250.306(e), the non-residential soil screening value for lead is based on the method presented in the report 'The Society for Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil' (Wixson, 1991). The model used by the PADEP and developed by SEGH was also used to calculate the site specific criterion for the facility. Based on the SEGH model and PADEP's default parameters, PADEP's non-residential direct contact MSC default value for lead in surface soil is 1,000 mg/kg. To develop a site-specific criteria for lead, the values used by PADEP for the target blood lead concentration (T) and geometric mean background blood lead concentration (B) were revised in consideration of site-specific conditions and updated lead data collected by the US Center for Disease Control and Prevention (CDC). Revised values for these parameters are discussed in the following paragraphs.

As presented in Appendix L, based on the revised parameters, the derived site-specific standard for lead in soil is 1,708 mg/kg for a Facility worker. Three shallow soil samples (S-381_0-5, BH-13_103_0-1 and BH-13-99_1.5-2) and three deep soil samples (S-381_2-3, BH-13-86_5.5-6 and BH-13-99_2.5-3) have concentrations of lead above the site specific criteria and will be delineated and remediated as described in the Clean-up Plan.

10.3 Groundwater

Results of the groundwater sampling indicated COCs at concentrations above their respective PADEP non-residential groundwater MSCs, including: benzene, chrysene, benzo(a)pyrene, benzo(b)fluoranthene, 1,2,4-TMB, 1,3,5-TMB, toluene, 1,2-dichloroethane, MTBE, total xylenes, ethylene dibromide, ethylbenzene, naphthalene and lead. Based on the fate and transport evaluation performed for AOI 4, potential off-site migration of dissolved COCs in groundwater above the MSCs does exist in the southeastern portion of AOI 4; however, the Penrose Recovery System serves as an engineering control to prevent the migration of impacted groundwater/LNAPL off-site in this area. No other areas exhibit the potential for off-site migration of dissolved COCs in groundwater.

Excavations in AOI 4 are governed by PES's permitting procedures which protect against potential exposures to groundwater that could be encountered in an excavation. Also, there are no complete direct contact exposure pathways for groundwater within AOI 4 because of on-site facility safety procedures and required PPE. Previous investigations and recent (2013) well searches verified that an "unknown use" well is located within 1.0 miles of the facility. Sunoco is currently investigating the purpose of this well.

10.4 LNAPL

There are no complete direct contact exposure pathways for LNAPL within AOI 4 because of on-site procedures and required PPE which prevent exposure to facility workers.

10.5 Vapor

In October 2012, Stantec completed an indoor air assessment that included all occupied buildings at the facility that are not under positive pressure (Appendix G of the AOI 4 SCR/RIR). In AOI 4, that evaluation included the 15 Pump House Building.

Congress designated the OSHA as the lead agency to regulate worker exposure in industrial settings in the Occupational Health and Safety Act of 1970. Consequently, the potential vapor intrusion risk to industrial workers at AOI 4 was assessed by comparing results of the indoor air samples to OSHA's PEL (8-hour time weighted average). At the 15 Pump House Building, benzene, toluene, ethylbenzene, total xylene, cumene, 1,3,5-TMB and 1,2,4-TMB were detected above the reporting limit but below the corresponding PEL by multiple orders of magnitude in one indoor air sample. Similarly, benzene, toluene, ethylbenzene, total xylene, 1,3,5-TMB and 1,2,4-TMB were detected above the reporting limit but below the corresponding PEL by multiple orders of magnitude in two outdoor air samples. Given that all samples collected from the building located in AOI 4 meet OSHA's exposure limits for the protection of worker health, the potential vapor intrusion pathway for existing buildings is not evaluated further in the risk assessment.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the completed closure and corrective action activities, the following conclusions and recommendations have been developed for ASTs PB 826, PB 843, PB 844, PB 845, PB 846, PB 847, PB 849, PB 880, PB 881, and PB 885 within AOI 4.

AST PB 826

Based on the results of previous and supplemental characterization work completed in the vicinity of this tank pursuant to the requirements of the Corrective Action Program, no remedies are required to address risks associated with the soil and groundwater conditions at AST PB 826. Therefore, no further corrective action is required and Sunoco requests the release from this tank be "administratively closed out."

AST PB 843

Based on the results of closure assessment work completed in the vicinity of this tank pursuant to the closure requirements of Chapter 245, no corrective action is required and Sunoco requests this tank be "administratively closed out." Although tank PB 843 was closed-in-place

by Sunoco in 2006, PES recently reactivated the tank and it is currently in use for crude oil storage. Refer to Appendix B for the PES documentation to the PADEP.

AST PB 844

Based on the results of closure assessment work completed in the vicinity of this tank pursuant to the closure requirements of Chapter 245, no corrective action is required and Sunoco requests this tank be "administratively closed out."

AST PB 845

Based on the results of closure assessment work completed in the vicinity of this tank pursuant to the closure requirements of Chapter 245, no corrective action is required and Sunoco requests this tank be "administratively closed out."

AST PB 846

Based on the results of previous and supplemental characterization work completed in the vicinity of this tank pursuant to the requirements of the Corrective Action Program, no remedies are required to address risks associated with the soil and groundwater conditions at AST PB 846. Also, based on the results of closure assessment work completed in the vicinity of this tank pursuant to the closure requirements of Chapter 245, no corrective action is required and Sunoco requests this tank be "administratively closed out."

AST PB 847

Based on the results of previous and supplemental characterization work completed in the vicinity of this tank pursuant to the requirements of the Corrective Action Program, no remedies are required to address risks associated with the soil and groundwater conditions at AST PB 847. Therefore, no further corrective action is required and Sunoco requests the release from this tank be "administratively closed out."

AST PB 849

Based on the results of closure assessment work completed in the vicinity of this tank pursuant to the closure requirements of Chapter 245, no corrective action is required and Sunoco requests this AST PB 849 be "administratively closed out."

AST PB 880

Site assessment and corrective action activities completed in response to the release to the tank dike of AST PB 880 fulfilled the requirements of the corrective action process. Therefore, no further corrective action is required and Sunoco requests the release from this tank be "administratively closed out."

AST PB 881

Site assessment and corrective action activities completed in response to the release from AST PB 881 and the release to the tank dike of AST PB 881 fulfilled the requirements of the corrective action process. Therefore, no further corrective action is required and Sunoco requests the release from this tank be "administratively closed out."

AST PB 885

Site assessment and corrective action activities completed in response to the release from AST PB 885 fulfilled the requirements of the corrective action process. Therefore, no further corrective action is required and Sunoco requests the release from this tank be "administratively closed out."

TABLES

Table 1
Constituents of Concern
AOI 4
PES Facility
Philadelphia, Pennsylvania

METALS	CAS No.
Lead (dissolved)	7439-92-1

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

SVOCs/ PAHs	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 and the March 18, 2008 revised PADEP Petroleum Short List.

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-SURFACE				PB-880-1				PB-880-2				PB-880-3				PB-880-4			
							Sample ID	880-SURFACE_04/08/2004				880-1_04/08/2004				880-2_04/08/2004				880-3_04/08/2004				880-4_04/08/2004			
							Sample Date	38085.6875				38085.625				38085.63542				38085.64236				38085.64583			
							Sample Interval (ft)	Unknown				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	**36**		0.0005	472.59	0.42		0.0005	17.28	ND	U	0.0005	20	ND	U	0.0005	21.95	0.14		0.0005	21.48
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	41		0.001	472.59	1		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	0.66		0.001	21.48
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	13		0.001	472.59	0.35		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	0.27		0.001	21.48
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	**140**		0.001	472.59	2.7		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	1.3		0.001	21.48
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	3.6	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.88	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	2.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	12		0.033	1	0.46	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.34	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	**52**		0.001	472.59	2		0.001	17.28	ND	U	0.001	20	ND	U	0.001	21.95	1.1		0.001	21.48
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	28		0.033	1	0.86	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.59	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	3.1	J	0.033	1	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-5				PB-880-6				PB-880-7				PB-880-8				PB-880-9			
							Sample ID	880-5_04/08/2004				880-6_04/08/2004				880-7_04/08/2004				880-8_04/08/2004				880-9_04/24/2004			
							Sample Date	38085.65278				38085.65972				38085.66667				38085.67361				38101.43056			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.22		0.0005	22.52	ND	U	0.0005	20.76	0.018	J	0.0005	20.16	**0.58**		0.0005	22.67	**3.1**		0.0005	43.18
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.3		0.001	22.52	ND	U	0.001	20.76	ND	U	0.001	20.16	1.2		0.001	22.67	13		0.001	43.18
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.49		0.001	22.52	ND	U	0.001	20.76	ND	U	0.001	20.16	0.39		0.001	22.67	4.6		0.001	43.18
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	2.4		0.001	22.52	0.034	J	0.001	20.76	0.03	J	0.001	20.16	3.2		0.001	22.67	29		0.001	215.89
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.22	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.74	J	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.16	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.52	J	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.17	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.59	J	0.033	1	ND	U	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.68	J	0.033	1	ND	U	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.2	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1	J	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.57		0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.9	J	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	2.1		0.001	22.52	ND	U	0.001	20.76	0.038	J	0.001	20.16	1.4		0.001	22.67	22		0.001	215.89
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	4.1	J	0.033	1	4.1	J	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.36	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.3	J	0.033	1	ND	U	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-880-10				PB-880-11				PB-880-12				PB-880-13				PB-881-1			
							Sample ID	880-10_04/24/2004				880-11_04/24/2004				880-12_04/24/2004				880-13_04/24/2004				881-1_07/22/2004			
							Sample Date	38101.44444				38101.44792				38101.45139				38101.45833				38190.45139			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.33		0.0005	45.96	**1.1**		0.0005	48.08	0.034	J	0.0005	45.87	**8**		0.0005	47.8	ND	U	0.002	13
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.72		0.001	45.96	6.3		0.001	48.08	0.15	J	0.001	45.87	3.3		0.001	47.8	ND	U	0.002	13
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.3		0.001	45.96	2.7		0.001	48.08	0.069	J	0.001	45.87	1.6		0.001	47.8	ND	U	0.005	13
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	1.7		0.001	45.96	12		0.001	48.08	0.26	J	0.001	45.87	24		0.001	191.2	0.0024	J	0.002	13
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.019		0.0006	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.077		0.0013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.091		0.002	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.067		0.0027	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.12		0.0027	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.075		0.002	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	1.4	J	0.033	5	2.8	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.0057	J	0.004	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.043		0.0033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	1.3		0.001	45.96	13		0.001	48.08	0.41		0.001	45.87	10		0.001	47.8	ND	U	0.01	13
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.3	J	0.033	5	5.9	J	0.033	5	ND	U	0.033	5	2	J	0.033	5	0.096		0.002	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.21		0.0047	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

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UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC

10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL

10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC

10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-2				PB-881-3				PB-881-4				PB-881-5				PB-881-6			
							Sample ID	881-2_07/22/2004				881-3_07/22/2004				881-4_07/22/2004				881-5_07/22/2004				881-6_07/22/2004			
							Sample Date	38190.46528				38190.47917				38190.49306				38190.50694				38190.51389			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.011		0.002	11	ND	U	0.002	222	ND	U	0.002	12	ND	U	0.002	2103	ND	U	0.002	3788
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.023		0.002	11	0.3		0.002	222	ND	U	0.002	12	ND	U	0.002	2103	ND	U	0.002	3788
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.084		0.005	11	0.85		0.005	222	ND	U	0.005	12	5.8		0.005	2103	ND	U	0.005	3788
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.032		0.002	11	0.25		0.002	222	0.0027	J	0.002	12	1.7		0.002	2103	ND	U	0.002	3788
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.057		0.0006	5	0.17	J	0.0006	5	ND	U	0.0006	5	0.89		0.0006	5	0.36	J	0.0006	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.018	J	0.0013	5	ND	U	0.0013	5	0.078	J	0.0013	5	ND	U	0.0013	5	ND	U	0.0013	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.021	J	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.019	J	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5	ND	U	0.0027	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.065	J	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5	ND	U	0.002	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.069	J	0.004	5	0.24	J	0.004	5	ND	U	0.004	5	1.8	J	0.004	5	ND	U	0.004	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5	ND	U	0.0033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	11	3.4		0.01	222	0.013		0.01	12	**31**		0.01	2103	20		0.01	3788
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.25		0.002	5	0.61	J	0.002	5	ND	U	0.002	5	4.2		0.002	5	0.66	J	0.002	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.12	J	0.0047	5	0.39	J	0.0047	5	ND	U	0.0047	5	1.6	J	0.0047	5	0.92	J	0.0047	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-7				PB-826-1				PB-826-2				PB-826-3				PB-826-4			
							Sample ID	881-7_07/22/2004				826-1_09/07/2004				826-2_09/07/2004				826-3_09/07/2004				826-4_09/07/2004			
							Sample Date	38190.52083				38237.52083				38237.53472				38237.55556				38237.56944			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	2439	ND	U	0.002	21	ND	U	0.002	21	ND	U	0.002	21	ND	U	0.002	21
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	2439	ND	U	0.002	21	0.0025	J	0.002	21	0.0022	J	0.002	21	ND	U	0.002	21
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.9		0.005	2439	ND	U	0.005	21	ND	U	0.005	21	ND	U	0.005	21	ND	U	0.005	21
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.33	J	0.002	2439	0.0027	J	0.002	21	0.0054		0.002	21	0.0043	J	0.002	21	ND	U	0.002	21
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.24	J	0.0006	5	0.068		0.0006	5	0.23		0.0006	5	0.023	J	0.0006	5	0.016		0.0006	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.0013	5	0.24		0.0013	5	0.88		0.0013	20	0.11		0.0013	5	0.083		0.0013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.002	5	0.25		0.002	5	0.8		0.002	20	0.16		0.002	5	0.1		0.002	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.0027	5	0.21		0.0027	5	0.71		0.0027	20	0.13		0.0027	5	0.086		0.0027	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.0027	5	0.42		0.0027	5	1		0.0027	5	0.28		0.0027	5	0.17		0.0027	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.002	5	0.23		0.002	5	0.82		0.002	5	0.13		0.002	5	0.089		0.002	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.49	J	0.004	5	0.033	J	0.004	5	0.11	J	0.004	5	ND	U	0.004	5	0.012	J	0.004	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.0033	5	0.097		0.0033	5	0.5		0.0033	5	0.071	J	0.0033	5	0.046		0.0033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	18		0.01	2439	ND	U	0.01	21	0.016	J	0.01	21	0.015	J	0.01	21	ND	U	0.01	21
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.1		0.002	5	0.39		0.002	5	1.5		0.002	5	0.15		0.002	5	0.12		0.002	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.54	J	0.0047	5	0.78		0.0047	5	2.4		0.0047	5	0.44		0.0047	5	0.25		0.0047	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-826-5				PB-826-6				PB-826-7				PB-826-8				PB-880-14			
							Sample ID	826-5_09/07/2004				826-6_09/07/2004				826-7_09/07/2004				826-8_09/07/2004				880-14_09/07/2004			
							Sample Date	38237.57639				38237.58333				38237.59028				38237.59722				38237.59722			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	21	ND	U	0.002	22	ND	U	0.002	22	ND	U	0.002	23	0.014		0.002	22
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	21	ND	U	0.002	22	ND	U	0.002	22	0.0048	J	0.002	23	ND	U	0.002	22
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	21	ND	U	0.005	22	ND	U	0.005	22	ND	U	0.005	23	0.031		0.005	22
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.0027	J	0.002	21	ND	U	0.002	22	ND	U	0.002	22	0.0081		0.002	23	0.037		0.002	22
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.0056	J	0.0006	1	0.00085	J	0.0006	1	ND	U	0.0006	1	0.023	J	0.0006	5	0.021	J	0.0006	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.027		0.0013	1	0.0056	J	0.0013	1	0.0041	J	0.0013	1	0.11		0.0013	5	0.063		0.0013	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.032		0.002	1	0.0085	J	0.002	1	0.0061	J	0.002	1	0.11		0.002	5	0.099		0.002	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.027		0.0027	1	0.0069	J	0.0027	1	0.0048	J	0.0027	1	0.11		0.0027	5	0.085		0.0027	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.052		0.0027	1	0.013	J	0.0027	1	0.011	J	0.0027	1	0.17		0.0027	5	0.1		0.0027	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.028		0.002	1	0.0064	J	0.002	1	0.0053	J	0.002	1	0.098		0.002	5	0.085		0.002	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.004	1	ND	U	0.004	1	ND	U	0.004	1	ND	U	0.004	5	0.026	J	0.004	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.024		0.0033	1	0.004	J	0.0033	1	ND	U	0.0033	1	0.06	J	0.0033	5	ND	U	0.0033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	21	ND	U	0.01	22	ND	U	0.01	22	ND	U	0.01	23	0.22		0.01	22
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.031		0.002	1	0.0059	J	0.002	1	0.0051	J	0.002	1	0.13		0.002	5	0.16		0.002	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.076		0.0047	1	0.017	J	0.0047	1	0.014	J	0.0047	1	0.28		0.0047	5	0.19		0.0047	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-826-9				PB-881-1				PB-881-2				PB-881-3				PB-881-4			
							Sample ID	826-9_09/07/2004				881-1_10/26/2005				881-2_10/26/2005				881-3_10/26/2005				881-4_10/26/2005			
							Sample Date	38237.60417				38651.54167				38651.54861				38651.55208				38651.55556			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.002	22	ND	U	0.0005	41.19	ND	U	0.0005	47.89	ND	U	0.0005	43.55	ND	U	0.0005	43.25
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.002	22	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.005	22	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.0036	J	0.002	22	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.025		0.0006	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.048		0.0013	1	0.2		0.033	1	0.046	J	0.033	1	ND	U	0.033	1	0.058	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.047		0.002	1	ND	U	0.033	1	0.06	J	0.033	1	ND	U	0.033	1	0.049	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.047		0.0027	1	ND	U	0.033	1	0.042	J	0.033	1	ND	U	0.033	1	0.047	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.068		0.0027	1	ND	U	0.033	1	0.065	J	0.033	1	0.057	J	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.074		0.002	1	0.15	J	0.033	1	0.14	J	0.033	1	ND	U	0.033	1	0.087	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.021	J	0.004	1	0.069	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.02		0.0033	1	ND	U	0.033	1	ND	U	0.033	1	0.052	J	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	22	ND	U	0.001	41.19	ND	U	0.001	47.89	ND	U	0.001	43.55	ND	U	0.001	43.25
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.18		0.002	1	0.13	J	0.033	1	0.058	J	0.033	1	ND	U	0.033	1	0.059	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.17		0.0047	1	0.11	J	0.033	1	0.1	J	0.033	1	0.054	J	0.033	1	0.098	J	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-881-5				PB-881-6				PB-843 LINE 7				PB-843 LINE 8				PB-843 LINE 9			
							Sample ID	881-5_10/26/2005				881-6_10/26/2005				843 LINE 7_08/23/2006				843 LINE 8_08/23/2006				843 LINE 9_08/23/2006			
							Sample Date	38651.5625				38651.56944				38952.5125				38952.51736				38952.52222			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	44.25	ND	U	0.0005	40	ND	U	0.0005	44.52	ND	U	0.0005	50.05	0.035	J	0.0005	46.69
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	0.044	J	0.033	1	0.31		0.033	1	0.34	J	0.033	1	0.087	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.05	J	0.033	1	0.058	J	0.033	1	0.34		0.033	1	0.4	J	0.033	1	0.065	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.061	J	0.033	1	0.057	J	0.033	1	0.49		0.033	1	0.62	J	0.033	1	0.099	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.053	J	0.033	1	0.078	J	0.033	1	0.28		0.033	1	0.57	J	0.033	1	0.085	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.051	J	0.033	1	0.064	J	0.033	1	0.41		0.033	1	0.47	J	0.033	1	0.11	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	0.042	J	0.033	1	0.3		0.033	1	0.4	J	0.033	1	0.054	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.001	44.25	ND	U	0.001	40	ND	U	0.001	44.52	ND	U	0.001	50.05	ND	U	0.001	46.69
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.14	J	0.033	1	0.26	J	0.033	1	0.16	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.081	J	0.033	1	0.082	J	0.033	1	0.49		0.033	1	0.53	J	0.033	1	0.17	J	0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-848 LINE 3				PB-848 LINE 1				PB-848 LINE 2				PB-847-AST-847-1				PB-847-AST-847-2			
							Sample ID	848 LINE 3_08/24/2006				848 LINE 1_08/24/2006				848 LINE 2_08/24/2006				AST-847-1/0-0.5_10/16/2006				AST-847-2/0-0.5_10/16/2006			
							Sample Date	38953.56736				38953.57431				38953.57639				39006.80556				39006.8125			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	46.17	ND	U	0.0005	47.66	ND	U	0.0005	49.36	ND	U	0.0005	51.33	ND	U	0.0005	49.36
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				ND	U	0.001	51.33	ND	U	0.001	49.36
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.061	J	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.075	J	0.033	1	ND	U	0.033	1	0.17	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	0.23	J	0.033	1	0.058	J	0.033	1	ND	U	0.033	1	0.18	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.067	J	0.033	1	0.046	J	0.033	1	0.16	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.059	J	0.033	1	ND	U	0.033	1	0.091	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	1	0.36	J	0.033	1	0.083	J	0.033	1	0.079	J	0.033	1	0.13	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.044	J	0.033	1	ND	U	0.033	1	0.091	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.071	J	0.001	46.17	ND	U	0.001	47.66	ND	U	0.001	49.36	ND	U	0.001	51.33	ND	U	0.001	49.36
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.048	J	0.033	1	0.043	J	0.033	1	0.3		0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.042	J	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	0.05	J	0.033	1	0.31		0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				268		0.44	1	185		0.44	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-847-AST-847-3				PB-847-AST-847-4				PB-847-AST-847-5				PB-847-AST-847-6				PB-885-AST-885-SS-4			
							Sample ID	AST-847-3/0-0.5_10/16/2006				AST-847-4/0-0.5_10/16/2006				AST-847-5/0-0.5_10/16/2006				AST-847-6/0-0.5_10/16/2006				AST-885-SS-4_11/30/2006			
							Sample Date	39006.81944				39006.82639				39006.83333				39006.84028				39051.58125			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.62	ND	U	0.0005	48.12	ND	U	0.0005	48.4	ND	U	0.0005	47.48	0.068	J	0.0005	48.45
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	4.4		0.001	48.45
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	ND	U	0.001	48.45
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	ND	U	0.001	48.45
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	ND	U	0.001	47.48	0.1	J	0.001	48.45
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.043	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.048	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.001	47.62	ND	U	0.001	48.12	ND	U	0.001	48.4	0.063	J	0.001	47.48	0.11	J	0.001	48.45
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.081	J	0.033	1	ND	U	0.033	1	0.5	J	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.085	J	0.033	1	ND	U	0.033	1	ND	U	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	177		0.44	1	35.1		0.44	1	154		0.44	1	15.8		0.44	1	NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-SS-5				PB-885-AST-885-SS-6				PB-885-AST-885-SS-7				PB-885-AST-885-SS-3				PB-885-AST-885-SS-8			
							Sample ID	AST-885-SS-5_11/30/2006				AST-885-SS-6_11/30/2006				AST-885-SS-7_11/30/2006				AST-885-SS-3_11/30/2006				AST-885-SS-8_11/30/2006			
							Sample Date	39051.58403				39051.58681				39051.58889				39051.59097				39051.59236			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.35		0.0005	51.55	**2.6**		0.0005	50.61	0.16	J	0.0005	51.76	ND	U	0.0005	56.56	ND	U	0.0005	57.01
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	27		0.001	51.55	97		0.001	506.07	66		0.001	517.6	ND	U	0.001	56.56	ND	U	0.001	57.01
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	3.4		0.001	51.55	13		0.001	50.61	2.4		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	1.7		0.001	51.55	5.4		0.001	50.61	2.9		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	3.3		0.001	51.55	26		0.001	506.07	3.4		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1	ND	U	0.033	5
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	0.22	J	0.033	5	0.076	J	0.033	1	ND	U	0.033	5
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.069	J	0.033	1	0.22	J	0.033	5
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.075	J	0.033	1	0.24	J	0.033	5
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.046	J	0.033	1	ND	U	0.033	5
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	0.22	J	0.033	5	0.077	J	0.033	1	ND	U	0.033	5
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.033	5	1.2		0.033	5	1.2		0.033	5	ND	U	0.033	1	ND	U	0.033	5
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.046	J	0.033	1	ND	U	0.033	5
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	5.6		0.001	51.55	15		0.001	50.61	11		0.001	51.76	ND	U	0.001	56.56	ND	U	0.001	57.01
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.5		0.033	5	2		0.033	5	2.3		0.033	5	0.12	J	0.033	1	ND	U	0.033	5
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.092	J	0.033	1	0.24	J	0.033	5
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-SS-9				PB-885-AST-885-SS-10				PB-885-AST-885-SS-2				PB-885-AST-885-SS-1				PB-884-AST-884-SS-2			
							Sample ID	AST-885-SS-9_11/30/2006				AST-885-SS-10_11/30/2006				AST-885-SS-2_11/30/2006				AST-885-SS-1_11/30/2006				AST-884-SS-2_11/30/2006			
							Sample Date	39051.59722				39051.59931				39051.60833				39051.61111				39051.61458			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	49.5	0.11	J	0.0005	53.82	0.1	J	0.0005	51.39	ND	U	0.0005	51.55	0.055	J	0.0005	48.54
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1.8		0.001	49.5	17		0.001	53.82	21		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	49.5	2.2		0.001	53.82	2.1		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.11	J	0.001	49.5	1.2		0.001	53.82	1.2		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	49.5	0.85		0.001	53.82	1.6		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.2	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.49	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.14	J	0.033	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.36	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.14	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.46	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.15	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.26	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.096	J	0.033	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.55	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.15	J	0.033	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.47	J	0.033	5	1.2		0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.3	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.1	J	0.033	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.55		0.001	49.5	6.5		0.001	53.82	4.8		0.001	51.39	ND	U	0.001	51.55	ND	U	0.001	48.54
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.4		0.033	5	2		0.033	5	0.88	J	0.033	5	ND	U	0.033	5	0.17	J	0.033	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.82	J	0.033	5	ND	U	0.033	5	ND	U	0.033	5	0.18	J	0.033	5	0.24		0.033	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

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MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-884-AST-884-SS-1				AST-845-LINE-1				AST-845-LINE-2				AST-845-LINE-3				AST-845-LINE-4			
							Sample ID	AST-884-SS-1_11/30/2006				AST-845-LINE-1				AST-845-LINE-2				AST-845-LINE-3				AST-845-LINE-4			
							Sample Date	39051.61597				39155				39155				39155				39155			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	6.4		0.001	48.97	ND	UD	0.097	50	0.077	JD	0.12	50	ND	UD	0.1	50	0.09	JD	0.12	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.74		0.001	48.97	ND	UD	0.097	50	0.068	JD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.49		0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.12	J	0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.045	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.073	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.081	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.088	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	0.47		0.4	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.058	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.1	J	0.033	1	ND	U	0.42	1	0.45		0.41	1	ND	U	0.39	1	ND	U	0.4	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	0.39		0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	0.047	J	0.033	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.39	1	ND	U	0.4	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	2.7		0.001	48.97	ND	UD	0.097	50	ND	UD	0.12	50	ND	UD	0.1	50	ND	UD	0.12	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.66		0.033	1	ND	U	0.42	1	0.64		0.41	1	ND	U	0.39	1	ND	U	0.4	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.11	J	0.033	1	ND	U	0.42	1	0.64		0.41	1	0.45		0.39	1	0.62		0.4	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AST-845-LINE-5				PB-885-AST-885-CS-1				PB-885-AST-885-CS-10				PB-885-AST-885-CS-11				PB-885-AST-885-CS-12			
							Sample ID	AST-845-LINE-5				AST-885-CS-1				AST-885-CS-10				AST-885-CS-11				AST-885-CS-12			
							Sample Date	39155				39155				39155				39155				39155			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.13	50	ND	UD	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	UD	0.13	50	2.1	D	0.096	50	0.15	D	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.13	50	0.11	D	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.13	50	0.054	JD	0.096	50	0.099	D	0.09	50	0.089	JD	0.095	50	ND	UD	0.094	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.13	50	ND	UD	0.096	50	ND	UD	0.09	50	ND	UD	0.095	50	ND	UD	0.094	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.49		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.53		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.49		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	UD	0.13	50	0.52	D	0.096	50	0.1	D	0.09	50	ND	UD	0.095	50	0.16	D	0.094	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.66		0.37	1	0.6		0.39	1	ND	U	0.4	1	ND	U	0.41	1	0.5		0.38	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	1		0.37	1	ND	U	0.39	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-13				PB-885-AST-885-CS-14				PB-885-AST-885-CS-15				PB-885-AST-885-CS-2				PB-885-AST-885-CS-3			
							Sample ID	AST-885-CS-13				AST-885-CS-14				AST-885-CS-15				AST-885-CS-2				AST-885-CS-3			
							Sample Date	39155				39155				39155				39155				39155			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	**0.55**	D	0.083	50	0.065	JD	0.09	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1.9	D	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	7.9	D	0.083	50	18	D	0.09	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.6	D	0.083	50	0.44	D	0.09	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	0.44	D	0.083	50	0.48	D	0.09	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.05	JD	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.1	D	0.083	50	0.61	D	0.09	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.45		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.76		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.46		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.68		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	0.56		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	0.49		0.41	1	3.3		0.38	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.48	D	0.094	50	ND	UD	0.089	50	ND	UD	0.096	50	1.4	D	0.083	50	4.1	D	0.09	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.38	1	ND	U	0.43	1	1.6		0.4	1	0.61		0.41	1	3.9		0.38	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.38	1	ND	U	0.43	1	1.1		0.4	1	ND	U	0.41	1	ND	U	0.38	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

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ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

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UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

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JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-4				PB-885-AST-885-CS-5				PB-885-AST-885-CS-6				PB-885-AST-885-CS-7				PB-885-AST-885-CS-8			
							Sample ID	AST-885-CS-4				AST-885-CS-5				AST-885-CS-6				AST-885-CS-7				AST-885-CS-8			
							Sample Date	39155				39155				39155				39155				39155			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	0.19	D	0.081	50	0.11	D	0.095	50	ND	UD	0.092	50	ND	UD	0.1	50	ND	UD	0.11	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	21	D	0.081	50	22	D	0.095	50	0.81	D	0.092	50	7.3	D	0.1	50	3.1	D	0.11	50
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.7	D	0.081	50	1.8	D	0.095	50	ND	UD	0.092	50	0.51	D	0.1	50	0.34	D	0.11	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	1.1	D	0.081	50	1.1	D	0.095	50	ND	UD	0.092	50	0.35	D	0.1	50	0.25	D	0.11	50
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	3.4	D	0.081	50	3.3	D	0.095	50	ND	UD	0.092	50	0.23	D	0.1	50	0.1	JD	0.11	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	4.6	D	0.081	50	4.3	D	0.095	50	0.19	D	0.092	50	1.2	D	0.1	50	0.74	D	0.11	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.38	1	2.5		0.38	1	0.72		0.42	1	ND	U	0.41	1	1.9		0.45	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.38	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.41	1	ND	U	0.45	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-885-AST-885-CS-9				PB-252-LINE-1				PB-252-LINE-2				PB-252-LINE-3				PB-849-LINE-1			
							Sample ID	AST-885-CS-9				PB-252-LINE-1				PB-252-LINE-2				PB-252-LINE-3				PB-849-LINE-1			
							Sample Date	39155				39232				39232				39232				39329			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	UD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	1	D	0.11	50	NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.11	50	0.15	JD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.11	JD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.11	50	ND	UD	0.28	50	ND	UD	0.21	50	ND	UD	0.22	50	ND	U	0.0056	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.45	1	ND	U	0.36	1	ND	U	0.36	1	ND	U	0.37	1	ND	UD	3.7	10
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.21	D	0.11	50	ND	UD	0.28	50	0.17	JD	0.21	50	0.19	JD	0.22	50	0.0039	J	0.0056	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.2		0.45	1	ND	U	0.36	1	0.55		0.36	1	0.91		0.37	1	ND	UD	3.7	10
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.45	1	NA				NA				NA				ND	UD	3.7	10
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	PB-849-LINE-2				PB-849-LINE-3				PB-849-LINE-4				AOI4-BH-13-97			
							Sample ID	PB-849-LINE-2				PB-849-LINE-3				PB-849-LINE-4				AOI4-BH-13-97.0-1_31413			
							Sample Date	39329				39329				39329				41347.42361			
							Sample Interval (ft)	0-0.5				0-0.5				0-0.5				0-1			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																							
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	NA				NA				NA				ND	U	0.0002	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				ND	U	0.00012	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				ND	U	0.00013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	NA				NA				NA				ND	U	0.00015	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0061	1	0.0046	J	0.0061	1	ND	U	0.0058	1	ND	U	0.00011	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	NA				NA				NA				ND	U	0.00013	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.0061	1	ND	U	0.0061	1	ND	U	0.0058	1	ND	U	0.00025	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.0061	1	ND	U	0.0061	1	ND	U	0.0058	1	ND	U	0.00007	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	NA				NA				NA				ND	U	0.00022	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.0061	1	0.0047	J	0.0061	1	ND	U	0.0058	1	ND	U	0.000099	1
Semi Volatile Organic Compounds																							
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.04	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.045	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.027	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.028	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.053	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.047	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.041	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	0.002	J	0.0061	1	0.0036	J	0.0061	1	0.002	J	0.0058	1	ND	U	0.045	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.035	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.4	1	ND	U	0.41	1	ND	U	0.38	1	ND	U	0.036	1
Metals																							
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	NA				NA				NA				81.5		0.18	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

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CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-91				AOI4-BH-13-98				AOI4-BH-13-88				AOI4_BH-13-94				S-381			
							Sample ID	AOI4-BH-13-91_0-2'_031413				AOI4-BH-13-98-1-2_31413				AOI4-BH-13-88_1.5-2_31413				AOI-4_BH-13-94_0-2_031513				AOI4-S-381_0-.5_31513			
							Sample Date	41347.45833				41347.46528				41347.47222				41348.33333				41348.36111			
							Sample Interval (ft)	0-2				1-2				1.5-2				0-2				0-0.5			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00018	1	ND	U	0.00021	1	13.6		0.023	1	ND	U	0.00021	1	ND	U	0.00022	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00011	1	ND	U	0.00013	1	ND	U	**0.014**	1	ND	U	0.00013	1	ND	U	0.00013	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.015	1	ND	U	0.00014	1	ND	U	0.00014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00014	1	ND	U	0.00016	1	ND	U	0.017	1	ND	U	0.00016	1	ND	U	0.00016	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.0001	1	ND	U	0.00012	1	ND	U	0.013	1	ND	U	0.00012	1	ND	U	0.00012	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00012	1	ND	U	0.00014	1	ND	U	0.015	1	ND	U	0.00014	1	ND	U	0.00014	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00023	1	ND	U	0.00027	1	ND	U	0.029	1	ND	U	0.00027	1	ND	U	0.00027	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000066	1	ND	U	0.000075	1	0.694		0.0081	1	ND	U	0.000076	1	ND	U	0.000077	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00021	1	ND	U	0.00024	1	ND	U	0.026	1	ND	U	0.00024	1	ND	U	0.00024	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000093	1	ND	U	0.00011	1	ND	U	0.011	1	ND	U	0.00011	1	ND	U	0.00011	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.039	1	ND	U	0.04	1	ND	U	0.042	1	ND	U	0.039	1	0.0439	J	0.041	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.043	1	0.105	J	0.045	1	ND	U	0.048	1	ND	U	0.044	1	0.143		0.046	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.026	1	0.0823	J	0.027	1	ND	U	0.029	1	0.0442	J	0.026	1	0.0854	J	0.027	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.13		0.027	1	0.189		0.028	1	ND	U	0.029	1	0.15		0.027	1	0.143		0.028	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.051	1	0.0753	J	0.053	1	ND	U	0.056	1	ND	U	0.051	1	0.0814	J	0.053	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.046	1	0.112	J	0.048	1	ND	U	0.05	1	ND	U	0.046	1	0.158		0.048	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.04	1	ND	U	0.041	1	ND	U	0.044	1	ND	U	0.04	1	ND	U	0.042	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.044	1	ND	U	0.046	1	2.53		0.048	1	ND	U	0.044	1	ND	U	0.046	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.034	1	0.0619	J	0.035	1	0.622		0.037	1	ND	U	0.034	1	0.598		0.036	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.034	1	0.201		0.036	1	0.0608	J	0.038	1	0.0604	J	0.035	1	0.381		0.036	1
Metals																											
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	60.8		0.18	1	136		0.18	1	10		0.2	1	43.8		0.18	1	**25800**		18	100

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.
B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-104				AOI4-BH-13-103				AOI4-BH-13-102			
							Sample ID	AOI4-BH-13-104_0-.5_31513				AOI4-BH-13-103_0-1_31813				AOI4-BH-13-102_0-1_31813			
							Sample Date	41348.41667				41351.34375				41351.35417			
							Sample Interval (ft)	0-0.5				0-1				0-1			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																			
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00021	1	ND	U	0.00032	1	ND	U	0.00023	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00019	1	ND	U	0.00014	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00021	1	ND	U	0.00015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	ND	U	0.00024	1	ND	U	0.00018	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.00018	1	ND	U	0.00013	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	ND	U	0.00021	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00026	1	ND	U	0.0004	1	ND	U	0.00029	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000074	1	ND	U	0.00011	1	ND	U	0.000083	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00036	1	ND	U	0.00026	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.00016	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																			
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.041	1	0.0731		0.013	1	ND	U	0.013	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	ND	U	0.046	1	0.0807		0.012	1	0.0292	J	0.012	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	ND	U	0.028	1	0.0794		0.012	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	ND	U	0.028	1	0.0607		0.013	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	ND	U	0.054	1	0.111		0.014	1	ND	U	0.013	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	ND	U	0.048	1	0.122		0.013	1	0.0338	J	0.012	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.042	1	ND	U	0.012	1	ND	U	0.012	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.046	1	0.0654		0.01	1	ND	U	0.0098	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.036	1	0.285		0.017	1	0.0401		0.016	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	ND	U	0.036	1	0.261		0.015	1	0.0476		0.014	1
Metals																			
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	7		0.18	1	**3020**		0.14	1	**1620**		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC

10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL

10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC

10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 2
Summary of Surface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Surface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Surface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[1]	Location	AOI4-BH-13-101				AOI4-BH-13-100				AOI4-BH-13-99			
							Sample ID	AOI4-BH-13-101_0-1_31813				AOI4-BH-13-100_0-1_31813				AOI4-BH-13-99_1.5-2_031813			
							Sample Date	41351.40972				41351.44444				41351.60417			
							Sample Interval (ft)	0-1				0-1				1.5-2			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																			
1,2,4-Trimethylbenzene	95-63-6	560	35	35	260	560	mg/kg	ND	U	0.00021	1	ND	U	0.00018	1	ND	U	0.00024	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00013	1	ND	U	0.00011	1	ND	U	0.00015	1
1,2-Dichloroethane	107-06-2	86	0.5	0.5	2.2	86	mg/kg	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00016	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	480	9.3	9.3	10000	480	mg/kg	ND	U	0.00016	1	ND	U	0.00014	1	ND	U	0.00019	1
Benzene	71-43-2	290	0.5	0.5	5.4	290	mg/kg	ND	U	0.00012	1	ND	U	0.0001	1	0.00024	J	0.00014	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	8000	1000	1000	2700	8000	mg/kg	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00027	1	ND	U	0.00023	1	ND	U	0.00031	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000076	1	ND	U	0.000065	1	0.00071	J	0.000087	1
Tert-Butyl Methyl Ether	1634-04-4	3200	2	2	220	3200	mg/kg	ND	U	0.00024	1	ND	U	0.00021	1	ND	U	0.00028	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00011	1	ND	U	0.000092	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																			
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.0182	J	0.013	1	ND	U	0.013	1	0.0675		0.014	1
Benzo(A)Anthracene	56-55-3	110	320	110	2.1	110	mg/kg	0.0559		0.012	1	0.0231	J	0.012	1	0.111		0.013	1
Benzo(A)Pyrene	50-32-8	11	46	11	0.21	11	mg/kg	0.0449		0.011	1	0.0243	J	0.011	1	0.157		0.012	1
Benzo(B)Fluoranthene	205-99-2	110	170	110	2.1	110	mg/kg	0.0544		0.012	1	0.0303	J	0.013	1	0.109		0.013	1
Benzo(G,H,I)Perylene	191-24-2	170000	180	180	NS	170000	mg/kg	0.0408		0.014	1	0.0274	J	0.014	1	0.215		0.014	1
Chrysene	218-01-9	11000	230	230	210	11000	mg/kg	0.0787		0.012	1	0.0263	J	0.013	1	0.145		0.013	1
Fluorene	86-73-7	110000	3800	3800	22000	110000	mg/kg	ND	U	0.012	1	ND	U	0.012	1	ND	U	0.013	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	110	28000	110	2.1	110	mg/kg	NA				NA				NA			
Naphthalene	91-20-3	56000	25	25	18	56000	mg/kg	ND	U	0.01	1	ND	U	0.01	1	0.0334	J	0.011	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.104		0.017	1	0.0235	J	0.017	1	0.237		0.018	1
Pyrene	129-00-0	84000	2200	2200	17000	84000	mg/kg	0.12		0.014	1	0.0297	J	0.014	1	0.196		0.015	1
Metals																			
Lead	7439-92-1	1000	450	450	800	1000	mg/kg	**494**		0.14	1	399		0.13	1	**11600**		0.68	5

Notes:

[1] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).

[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).

[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.

[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).

CAS - Chemical Abstracts Service Registry Number

PADEP - Pennsylvania Department of Environmental Protection

mg/kg - milligram per kilogram

MSC - Medium Specific Concentration

DL - Lab detection limit (actual limit may be either the quantification or method detection limit)

ND - Not Detected

DF - Dilution Factor

Q - Lab Qualifier

NA - Not Analyzed

NS - No Standard

Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP MSC and EPA Soil RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.

UD - The analyte was analyzed but not detected above the detection limit. The sample was diluted.

J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

JD - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated. The sample was diluted.

B - (inorganics) Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.

D - The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 PERIMETER 4				PB-843 PERIMETER 3				PB-843 PERIMETER 2				PB-843 PERIMETER 5				PB-843 PERIMETER 6			
							Sample ID	843 PERIMETER 4_08/23/2006				843 PERIMETER 3_08/23/2006				843 PERIMETER 2_08/23/2006				843 PERIMETER 5_08/23/2006				843 PERIMETER 6_08/23/2006			
							Sample Date	38952.36806				38952.37569				38952.38056				38952.38472				38952.38889			
							Sample Interval (ft)	3-3.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.45	ND	U	0.0005	46.73	0.037	J	0.0005	46.77	ND	U	0.0005	44.09	ND	U	0.0005	42.23
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.6		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.86		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.51		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.64		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.23		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.77		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.28		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.45	ND	U	0.001	46.73	ND	U	0.001	46.77	ND	U	0.001	44.09	ND	U	0.001	42.23
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	2.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	1.5		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 PERIMETER 1				PB-843 SUB 2				PB-843 LINE 1				PB-843 LINE 2				PB-843 LINE 3			
							Sample ID	843 PERIMETER 1_08/23/2006				843 SUB 2_08/23/2006				843 LINE 1_08/23/2006				843 LINE 2_08/23/2006				843 LINE 3_08/23/2006			
							Sample Date	38952.39583				38952.43056				38952.44028				38952.44653				38952.45			
							Sample Interval (ft)	3-3.5				5-5.5				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	52.52	ND	U	0.0005	43.4	ND	U	0.0005	49.02	ND	U	0.0005	46.13	ND	U	0.0005	43.71
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	0.11	J	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.14	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.067	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.086	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.39		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	52.52	ND	U	0.001	43.4	ND	U	0.001	49.02	ND	U	0.001	46.13	ND	U	0.001	43.71
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.8		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.31		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-843 LINE 4				PB-843 LINE 5				PB-843 LINE 6				PB-843 SUB 1				PB-843 SUB 3			
							Sample ID	843 LINE 4_08/23/2006				843 LINE 5_08/23/2006				843 LINE 6_08/23/2006				843 SUB 1_08/23/2006				843 SUB 3_08/23/2006			
							Sample Date	38952.45764				38952.4625				38952.46875				38952.47917				38952.48958			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5.5-5				5.5-5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	43.03	ND	U	0.0005	46.73	ND	U	0.0005	48.64	ND	U	0.0005	42.88	ND	U	0.0005	42.41
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	ND	U	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	1.4		0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	ND	U	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.13	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.23	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	43.03	ND	U	0.001	46.73	0.067	J	0.001	48.64	ND	U	0.001	42.88	ND	U	0.001	42.41
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	2.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.37	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 10				PB-844 LINE 9				PB-844 PERIMETER 3				PB-844 LINE 6				PB-844 LINE 5			
							Sample ID	844 LINE 10_08/23/2006				844 LINE 9_08/23/2006				844 PERIMETER 3_08/23/2006				844 LINE 6_08/23/2006				844 LINE 5_08/23/2006			
							Sample Date	38952.53819				38952.54861				38952.55069				38952.55347				38952.55764			
							Sample Interval (ft)	5.5-6				5.5-6				3-3.5				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**2.4**		0.0005	178.41	0.035	J	0.0005	43.9	ND	U	0.0005	44.8	ND	U	0.0005	49.16	0.034	J	0.0005	47.04
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	8.3		0.001	178.41	0.22	J	0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	4.2		0.001	178.41	0.34		0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	178.41	ND	U	0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	4		0.033	1	ND	U	0.033	1	0.15	J	0.033	1	ND	U	0.033	1	0.078	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.54		0.033	1	0.17	J	0.033	1	0.53		0.033	1	ND	U	0.033	1	0.31		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.1	J	0.033	1	0.2		0.033	1	0.5		0.033	1	ND	U	0.033	1	0.31		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.066	J	0.033	1	0.19	J	0.033	1	0.53		0.033	1	ND	U	0.033	1	0.32		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.15	J	0.033	1	0.28		0.033	1	ND	U	0.033	1	0.17	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.56		0.033	1	0.45		0.033	1	0.49		0.033	1	ND	U	0.033	1	0.27		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	2.2		0.033	1	0.97		0.033	1	0.075	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.038	J	0.033	1	0.14	J	0.033	1	0.32		0.033	1	ND	U	0.033	1	0.16	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	12		0.001	178.41	0.95		0.001	43.9	ND	U	0.001	44.8	ND	U	0.001	49.16	ND	U	0.001	47.04
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.1		0.033	1	1.9		0.033	1	0.6		0.033	1	ND	U	0.033	1	0.23		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.43		0.033	1	0.32		0.033	1	0.66		0.033	1	ND	U	0.033	1	0.29		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 8				PB-844 LINE 7				PB-844 PERIMETER 2				PB-844 PERIMETER 1				PB-844 PERIMETER 6			
							Sample ID	844 LINE 8_08/23/2006				844 LINE 7_08/23/2006				844 PERIMETER 2_08/23/2006				844 PERIMETER 1_08/23/2006				844 PERIMETER 6_08/23/2006			
							Sample Date	38952.56181				38952.56528				38952.56875				38952.57222				38952.575			
							Sample Interval (ft)	5.5-6				5.5-6				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.067	J	0.0005	44.96	ND	U	0.0005	48.59	ND	U	0.0005	49.7	ND	U	0.0005	45.45	ND	U	0.0005	46.9
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.25		0.033	1	0.17	J	0.033	1	0.32		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.11	J	0.033	1	0.057	J	0.033	1	0.64		0.033	1	0.57		0.033	1	0.78		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.11	J	0.033	1	0.054	J	0.033	1	0.51		0.033	1	0.68		0.033	1	0.69		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.13	J	0.033	1	0.054	J	0.033	1	0.56		0.033	1	0.72		0.033	1	0.87		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.082	J	0.033	1	ND	U	0.033	1	0.32		0.033	1	0.44		0.033	1	0.42		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.12	J	0.033	1	0.056	J	0.033	1	0.6		0.033	1	0.52		0.033	1	0.74		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	0.1	J	0.033	1	0.075	J	0.033	1	0.15	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.073	J	0.033	1	ND	U	0.033	1	0.35		0.033	1	0.54		0.033	1	0.49		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	44.96	ND	U	0.001	48.59	ND	U	0.001	49.7	ND	U	0.001	45.45	ND	U	0.001	46.9
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.076	J	0.033	1	0.056	J	0.033	1	0.71		0.033	1	0.55		0.033	1	1		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.14	J	0.033	1	0.069	J	0.033	1	0.9		0.033	1	0.62		0.033	1	1.1		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 PERIMETER 5				PB-844 LINE 3				PB-844 SUB 2				PB-844 SUB 3				PB-844 LINE 1			
							Sample ID	844 PERIMETER 5_08/23/2006				844 LINE 3_08/23/2006				844 SUB 2_08/23/2006				844 SUB 3_08/23/2006				844 LINE 1_08/23/2006			
							Sample Date	38952.58542				38952.58958				38952.59722				38952.61319				38952.61875			
							Sample Interval (ft)	3-3.5				5.5-6				5-5.5				5-5.5				5-5.6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.13	ND	U	0.0005	46.9	ND	U	0.0005	46.43	0.095	J	0.0005	45.33	ND	U	0.0005	45.13
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.073	J	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	0.078	J	0.001	45.33	ND	U	0.001	45.13
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.48		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.078	J	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.11	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.11	J	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.068	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.089	J	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.093	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.097	J	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.13	J	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.15	J	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.048	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.088	J	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	46.9	ND	U	0.001	46.43	ND	U	0.001	45.33	ND	U	0.001	45.13
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.18	J	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.38		0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.17	J	0.033	1	ND	U	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-844 LINE 2				PB-844 SUB 1				PB-844 PERIMETER 4				PB-844 LINE 4				PB-846 LINE 2			
							Sample ID	844 LINE 2_08/23/2006				844 SUB 1_08/23/2006				844 PERIMETER 4_08/23/2006				844 LINE 4_08/23/2006				846 LINE 2_08/24/2006			
							Sample Date	38952.625				38952.63542				38952.6375				38952.64028				38953.34028			
							Sample Interval (ft)	5.5-6				5.5-5.5				3-3.5				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.76	0.031	J	0.0005	44.01	0.38		0.0005	48.26	ND	U	0.0005	48.22	ND	U	0.0005	50.15
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.32		0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	ND	U	0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.52		0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	0.92		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	0.21		0.033	1	2.3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	1.8		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	0.15	J	0.033	1	2.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.073	J	0.033	1	1		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	0.2		0.033	1	1.9		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	0.067	J	0.033	1	0.42		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	0.087	J	0.033	1	1.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	47.76	ND	U	0.001	44.01	0.13	J	0.001	48.26	ND	U	0.001	48.22	ND	U	0.001	50.15
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	0.52		0.033	1	3		0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	0.37		0.033	1	3		0.033	1	ND	U	0.033	1	0.045	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 LINE 1				PB-846 LINE 7				PB-846 LINE 4				PB-846 LINE 5				PB-846 LINE 6			
							Sample ID	846 LINE 1_08/24/2006				846 LINE 7_08/24/2006				846 LINE 4_08/24/2006				846 LINE 5_08/24/2006				846 LINE 6_08/24/2006			
							Sample Date	38953.36458				38953.38194				38953.38819				38953.39236				38953.39653			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	48.26	0.029	J	0.0005	49.7	0.037	J	0.0005	54.59	0.22	J	0.0005	45.41	0.12	J	0.0005	48.78
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	ND	U	0.001	54.59	0.62		0.001	45.41	ND	U	0.001	48.78
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	0.16	J	0.001	54.59	0.29		0.001	45.41	ND	U	0.001	48.78
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	48.26	ND	U	0.001	49.7	ND	U	0.001	54.59	0.12	J	0.001	45.41	0.1	J	0.001	48.78
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.038	J	0.033	1	0.22		0.033	1	0.12	J	0.033	1	0.16	J	0.033	1	0.24		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.066	J	0.033	1	0.58		0.033	1	0.1	J	0.033	1	0.38		0.033	1	0.37		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.05	J	0.033	1	0.49		0.033	1	0.038	J	0.033	1	0.32		0.033	1	0.2		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.063	J	0.033	1	0.65		0.033	1	0.061	J	0.033	1	0.43		0.033	1	0.3		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	0.34		0.033	1	ND	U	0.033	1	0.21		0.033	1	0.12	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.067	J	0.033	1	0.55		0.033	1	0.29		0.033	1	0.51		0.033	1	0.85		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	0.14	J	0.033	1	0.73		0.033	1	0.38		0.033	1	0.55		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	0.33		0.033	1	ND	U	0.033	1	0.2		0.033	1	0.096	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.14	J	0.001	48.26	0.1	J	0.001	49.7	0.14	J	0.001	54.59	0.76		0.001	45.41	0.062	J	0.001	48.78
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.12	J	0.033	1	0.73		0.033	1	1.9		0.033	1	1.6		0.033	1	1.4		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.12	J	0.033	1	1		0.033	1	0.3		0.033	1	0.68		0.033	1	0.88		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 PERIMETER 6				PB-846 PERIMETER 5				PB-846 PERIMETER 4				PB-846 PERIMETER 3				PB-846 PERIMETER 2			
							Sample ID	846 PERIMETER 6_08/24/2006				846 PERIMETER 5_08/24/2006				846 PERIMETER 4_08/24/2006				846 PERIMETER 3_08/24/2006				846 PERIMETER 2_08/24/2006			
							Sample Date	38953.39931				38953.40208				38953.40486				38953.40764				38953.41111			
							Sample Interval (ft)	3-3.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.12	J	0.0005	44.44	ND	U	0.0005	43.94	ND	U	0.0005	49.16	ND	U	0.0005	46.47	0.039	J	0.0005	44.52
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.063	J	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.063	J	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	ND	U	0.001	46.47	ND	U	0.001	44.52
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	2		0.033	1	ND	U	0.033	1	0.19	J	0.033	1	1.5		0.033	1	0.086	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	3.5		0.033	1	ND	U	0.033	1	1.3		0.033	1	3.9		0.033	1	0.17	J	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.4		0.033	1	ND	U	0.033	1	1.4		0.033	1	3.3		0.033	1	0.16	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	3.2		0.033	1	ND	U	0.033	1	1.8		0.033	1	4.4		0.033	1	0.26		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	ND	U	0.033	1	0.63		0.033	1	1.8		0.033	1	0.2		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	3.4		0.033	1	ND	U	0.033	1	1.1		0.033	1	3.6		0.033	1	0.28		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.7		0.033	1	ND	U	0.033	1	0.11	J	0.033	1	0.57		0.033	1	0.09	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	ND	U	0.033	1	0.73		0.033	1	1.9		0.033	1	0.13	J	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	1.1		0.001	44.44	ND	U	0.001	43.94	ND	U	0.001	49.16	0.16	J	0.001	46.47	0.095	J	0.001	44.52
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	9.1		0.033	5	ND	U	0.033	1	0.69		0.033	1	4.9		0.033	5	0.3		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	7.2		0.033	5	ND	U	0.033	1	1.1		0.033	1	6.3		0.033	5	0.35		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-846 PERIMETER 1				PB-846 LINE 3				PB-846 SUB 1				PB-846 SUB 2				PB-846 SUB 3			
							Sample ID	846 PERIMETER 1_08/24/2006				846 LINE 3_08/24/2006				846 SUB 1_08/24/2006				846 SUB 2_08/24/2006				846 SUB 3_08/24/2006			
							Sample Date	38953.42847				38953.44792				38953.48056				38953.4875				38953.49861			
							Sample Interval (ft)	3-3.5				5.5-6				5-5.5				5-5.5				5-5.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**5**		0.0005	46.55	ND	U	0.0005	47.39	ND	U	0.0005	43.9	ND	U	0.0005	46	0.027	J	0.0005	44.29
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	1.8		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	6.5		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.28		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	ND	U	0.001	44.29
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.6		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	3.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.8		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.6		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	2.9		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	3.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.6		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	2		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	3.7		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	4.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.1		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	1.8		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	2.3		0.001	46.55	ND	U	0.001	47.39	ND	U	0.001	43.9	ND	U	0.001	46	0.16	J	0.001	44.29
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	9.3		0.033	5	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	6.2		0.033	3
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	4.1		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	6.4		0.033	3
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
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Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848 SUB 1				PB-848 PERIMETER 1				PB-848 PERIMETER 2				PB-848 LINE 6				PB-848 PERIMETER 3			
							Sample ID	848 SUB 1_08/24/2006				848 PERIMETER 1_08/24/2006				848 PERIMETER 2_08/24/2006				848 LINE 6_08/24/2006				848 PERIMETER 3_08/24/2006			
							Sample Date	38953.53125				38953.53958				38953.54375				38953.54861				38953.55278			
							Sample Interval (ft)	5-5.5				3-3.5				3-3.5				5.5-6				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	49.26	ND	U	0.0005	45.96	ND	U	0.0005	44.09	ND	U	0.0005	45.17	ND	U	0.0005	44.96
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	ND	U	0.001	44.96
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	0.81		0.001	45.17	0.15	J	0.001	44.96
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	ND	U	0.001	44.96
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.11	J	0.033	1	0.06	J	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.071	J	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.16	J	0.033	1	0.15	J	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.51		0.033	1	0.59		0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	49.26	ND	U	0.001	45.96	ND	U	0.001	44.09	ND	U	0.001	45.17	0.059	J	0.001	44.96
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.87		0.033	1	0.88		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.15	J	0.033	1	0.12	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848 LINE 7				PB-848 SUB 3				PB-848 PERIMETER 6				PB-848 SUB 2				PB-845 PERIMETER 1			
							Sample ID	848 LINE 7_08/24/2006				848 SUB 3_08/24/2006				848 PERIMETER 6_08/24/2006				848 SUB 2_08/24/2006				845 PERIMETER 1_08/24/2006			
							Sample Date	38953.55833				38953.57153				38953.59375				38953.60486				38953.61389			
							Sample Interval (ft)	5.5-6				5-5.5				3-3.5				5-5.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	0.1	J	0.0005	45.33	**20**		0.0005	469.92	ND	U	0.0005	48.03	ND	U	0.0005	44.37	ND	U	0.0005	47.8
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.26	J	0.001	45.33	46		0.001	469.92	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	4.6		0.001	45.33	8.9		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.33	1.5		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.35		0.033	1	0.21		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.16	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.14	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.044	J	0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.12	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.05	J	0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.067	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.056	J	0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.53		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.068	J	0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	1.3		0.033	1	2.2		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.059	J	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.001	45.33	4.9		0.001	46.99	ND	U	0.001	48.03	ND	U	0.001	44.37	ND	U	0.001	47.8
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	3.1		0.033	1	1.9		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.44		0.033	1	ND	U	0.033	1	ND	U	0.033	1	ND	U	0.033	1	0.057	J	0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845 PERIMETER 2				PB-845 PERIMETER 3				PB-845 SUB 1				PB-845 PERIMETER 5				PB-845 PERIMETER 4			
							Sample ID	845 PERIMETER 2_08/24/2006				845 PERIMETER 3_08/24/2006				845 SUB 1_08/24/2006				845 PERIMETER 5_08/24/2006				845 PERIMETER 4_08/24/2006			
							Sample Date	38953.62153				38953.62778				38953.63542				38953.64583				38953.64931			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	45.13	ND	U	0.0005	49.12	ND	U	0.0005	46.95	ND	U	0.0005	47.66	ND	U	0.0005	48.45
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	ND	U	0.001	47.66	ND	U	0.001	48.45
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	0.18	J	0.001	47.66	ND	U	0.001	48.45
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	45.13	ND	U	0.001	49.12	ND	U	0.001	46.95	ND	U	0.001	47.66	ND	U	0.001	48.45
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	1.2		0.033	1	0.43		0.033	1	0.4		0.033	1	ND	U	0.033	1	0.24		0.033	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	2.8		0.033	1	1.5		0.033	1	1.2		0.033	1	0.59	J	0.033	1	0.75		0.033	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	2.3		0.033	1	1.4		0.033	1	0.86		0.033	1	0.65	J	0.033	1	0.68		0.033	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	2.8		0.033	1	1.6		0.033	1	1.2		0.033	1	1.2		0.033	1	0.88		0.033	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	1.4		0.033	1	0.84		0.033	1	0.48		0.033	1	0.72	J	0.033	1	0.46		0.033	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	2.8		0.033	1	1.5		0.033	1	1.2		0.033	1	3.1		0.033	1	0.74		0.033	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.51		0.033	1	0.18	J	0.033	1	0.19	J	0.033	1	0.59	J	0.033	1	0.13	J	0.033	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	1.4		0.033	1	0.81		0.033	1	0.53		0.033	1	0.48	J	0.033	1	0.43		0.033	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.12	J	0.001	45.13	ND	U	0.001	49.12	0.067	J	0.001	46.95	1.2		0.001	47.66	ND	U	0.001	48.45
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.3		0.033	2	2		0.033	1	1.7		0.033	1	1.8		0.033	1	0.97		0.033	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	4.4		0.033	2	2.6		0.033	1	2.2		0.033	1	2		0.033	1	1.3		0.033	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:
[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
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MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:
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J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
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UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845 SUB 3				PB-845 SUB 2				PB-849-PER1				PB-849-PER2				PB-849-PER3			
							Sample ID	845 SUB 3_08/24/2006				845 SUB 2_08/24/2006				PB-849-PER1				PB-849-PER2				PB-849-PER3			
							Sample Date	38953.65833				38953.67361				39227				39227				39227			
							Sample Interval (ft)	5-5.5				5-5.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	47.53	ND	U	0.0005	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	47.53	ND	U	0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	0.59		0.033	1	0.11	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.64		0.033	1	0.11	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.44		0.033	1	0.085	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.65		0.033	1	0.12	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.25		0.033	1	0.051	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.66		0.033	1	0.14	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.52		0.033	1	0.19	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.27		0.033	1	0.061	J	0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.45		0.001	47.53	0.31		0.001	48.83	ND	UD	0.18	50	ND	UD	0.16	50	ND	UD	0.29	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.9		0.033	1	0.62		0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	1.3		0.033	1	0.28		0.033	1	ND	U	0.4	1	ND	U	0.4	1	ND	U	0.4	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-849-PER4				PB-849-PER5				PB-849-SUB1				PB-252-LINE-4				PB-252-LINE-5			
							Sample ID	PB-849-PER4				PB-849-PER5				PB-849-SUB1				PB-252-LINE-4				PB-252-LINE-5			
							Sample Date	39227				39227				39227				39232				39232			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				6-6.5				6-6.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	**22**	D	1.7	500	**1.6**	D	0.15	500
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	**73**	D	1.7	500	63	D	1.5	500
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	11	D	1.7	500	9.9	D	1.5	500
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.16	50	ND	UD	0.15	50	ND	UD	0.31	50	94	D	1.7	500	51	D	1.5	500
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	1.6		0.42	1	2.6		0.41	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	UD	0.16	50	ND	UD	**50**	50	ND	UD	0.31	50	**49**	D	1.7	500	**43**	D	1.5	500
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	2.5		0.42	1	4.4		0.41	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.37	1	ND	U	0.4	1	ND	U	0.42	1	NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:
[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:
U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
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PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-252-LINE-6				PB-252-PER-1				PB-252-PER-2				PB-252-PER-3				PB-252-PER-4			
							Sample ID	PB-252-LINE-6				PB-252-PER-1				PB-252-PER-2				PB-252-PER-3				PB-252-PER-4			
							Sample Date	39232				39232				39232				39232				39232			
							Sample Interval (ft)	6-6.5				3-3.5				3-3.5				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**0.71**	D	0.18	50	**10**	D	1.7	500	**2.2**	D	0.17	500	**0.72**	D	0.19	500	**1.7**	D	0.18	500
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	6.7	D	0.18	50	37	D	1.7	500	35	D	1.7	500	23	D	1.9	500	18	D	1.8	500
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	14	D	0.18	50	7.5	D	1.7	500	12	D	0.17	500	11	D	0.19	500	6.4	D	0.18	500
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.45	D	0.18	50	7.5	D	1.7	500	0.42	D	0.17	500	0.59	D	0.19	500	0.72	D	0.18	500
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	2.1		0.41	1	ND	U	0.4	1	ND	U	0.38	1	ND	U	0.42	1	ND	U	0.42	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	7.9	D	0.18	50	**29**	D	1.7	500	4.8	D	0.17	500	**29**	D	1.9	500	12	D	0.18	500
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	4.1		0.41	1	7.9	D	0.79	2	0.48		0.38	1	0.23	J	0.42	1	3.9		0.42	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	NA				NA				NA				NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
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PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-252-PER-5				PB-252-PER-6				PB-252-SUB-1				PB-252-SUB-2				PB-252-SUB-3			
							Sample ID	PB-252-PER-5				PB-252-PER-6				PB-252-SUB-1				PB-252-SUB-2				PB-252-SUB-3			
							Sample Date	39232				39232				39232				39232				39232			
							Sample Interval (ft)	3-3.5				3-3.5				5-5.5				5-5.5				5-5.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	**2.1**	D	0.16	50	**4.7**	D	0.18	50	ND	UD	0.26	50	**4.7**	D	0.31	500	ND	UD	0.3	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	6.4	D	0.16	50	9.3	D	0.18	50	ND	UD	0.26	50	44	D	3.1	500	ND	UD	0.3	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.7	D	0.16	50	2.3	D	0.18	50	ND	UD	0.26	50	11	D	0.31	500	ND	UD	0.3	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.3	D	0.16	50	2.7	D	0.18	50	ND	UD	0.26	50	5.2	D	0.31	500	ND	UD	0.3	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	4.2		0.39	1	0.42		0.39	1	ND	U	0.38	1	ND	U	0.41	1	ND	U	0.43	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	**26**	D	1.6	500	3.8	D	0.18	50	0.26	JD	0.26	50	24	D	0.31	500	ND	UD	0.3	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	14	D	2	5	1		0.39	1	ND	U	0.38	1	ND	U	0.41	1	ND	U	0.43	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	NA				NA				NA				NA				NA			
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
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MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848-LINE-10				PB-848-LINE-11				PB-848-LINE-12				PB-848-LINE-13				PB-848-LINE-4			
							Sample ID	PB-848-LINE-10				PB-848-LINE-11				PB-848-LINE-12				PB-848-LINE-13				PB-848-LINE-4			
							Sample Date	39232				39232				39232				39232				39232			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				5.5-6				5.5-6			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.15	50	ND	UD	0.16	50	ND	UD	0.33	50	0.13	JD	0.21	50	ND	UD	0.19	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.69	D	0.15	50	0.084	JD	0.16	50	0.24	JD	0.33	50	0.16	JD	0.21	50	ND	UD	0.19	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	2.5	D	0.15	50	ND	UD	0.16	50	0.41	D	0.33	50	ND	UD	0.21	50	8.5	D	0.19	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.15	50	0.1	JD	0.16	50	ND	UD	0.33	50	ND	UD	0.21	50	ND	UD	0.19	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.66		0.43	1	0.38	J	0.4	1	ND	U	0.42	1	ND	U	0.39	1	0.75		0.43	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.28	D	0.15	50	0.3	D	0.16	50	1.9	D	0.33	50	ND	UD	0.21	50	ND	UD	0.19	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	1.5		0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	1.7		0.43	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.43	1	ND	U	0.4	1	ND	U	0.42	1	ND	U	0.39	1	ND	U	0.43	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-848-LINE-5				PB-848-LINE-8				PB-848-LINE-9				PB-848-PER-4				PB-848-PER-5			
							Sample ID	PB-848-LINE-5				PB-848-LINE-8				PB-848-LINE-9				PB-848-PER-4				PB-848-PER-5			
							Sample Date	39232				39232				39232				39232				39232			
							Sample Interval (ft)	5.5-6				5.5-6				5.5-6				3-3.5				3-3.5			
							Sample Purpose	Tank Closure				Tank Closure				Tank Closure				Tank Closure				Tank Closure			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	UD	0.3	50	ND	UD	0.27	50	ND	UD	0.18	50	**0.93**	D	0.18	50	ND	UD	0.18	50
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	UD	0.3	50	1.7	D	0.27	50	0.2	D	0.18	50	0.27	D	0.18	50	ND	UD	0.18	50
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.94	D	0.3	50	8.6	D	0.27	50	0.9	D	0.18	50	0.63	D	0.18	50	ND	UD	0.18	50
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	UD	0.3	50	ND	UD	0.27	50	0.14	JD	0.18	50	ND	UD	0.18	50	ND	UD	0.18	50
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.43	1	0.83		0.41	1	0.48		0.42	1	10	D	2.3	5	ND	U	0.37	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	UD	0.3	50	0.33	D	0.27	50	0.9	D	0.18	50	ND	UD	0.18	50	ND	UD	0.18	50
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.43	1	1.5		0.41	1	0.79		0.42	1	13	D	2.3	5	ND	U	0.37	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.43	1	ND	U	0.41	1	ND	U	0.42	1	ND	UD	2.3	5	ND	U	0.37	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				NA				NA				NA				NA			

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	PB-845-PER-6				S-373				S-381				S-381				S-381			
							Sample ID	PB-845-PER-6_02/12/2008				AOI4-S-373_4-6'				AOI4-S-381_2-3_31513				S-381 @ 12'_04242013				S-381 @ 24'_04252013			
							Sample Date	39490.53472				41352.45833				41348.37153				41388.46528				41388.35417			
							Sample Interval (ft)	3-3.5				4-6				2-3				11.5-12				23.5-24			
							Sample Purpose	Tank Closure				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	NA				2.56		0.54	1	29.9		0.12	1	0.0032	J	0.00019	1	0.518	J	0.11	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	NA				ND	U	**0.11**	1	ND	U	**0.075**	1	ND	U	0.0011	1	ND	U	0.0011	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	NA				ND	U	0.11	1	ND	U	0.08	1	ND	U	0.00012	1	ND	U	0.068	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	NA				2.88		0.54	1	**11.9**		0.094	1	ND	U	0.00014	1	0.543	J	0.081	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0005	46.04	**1.25**		0.11	1	0.242	J	0.07	1	0.0403		0.00011	1	**1.11**		0.06	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	NA				3.76		0.11	1	17.7		0.082	1	0.0056		0.00012	1	1.01		0.07	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.001	46.04	2.12		0.11	1	5.54		0.16	1	0.0021		0.00023	1	0.439	J	0.13	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.001	46.04	0.718		0.54	1	1.97	J	0.044	1	0.0033	J	0.000066	1	11.7		0.037	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	NA				ND	U	0.11	1	ND	U	0.14	1	ND	U	0.00021	1	ND	U	0.12	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.001	46.04	0.339		0.11	1	0.419	J	0.062	1	0.0076		0.000093	1	0.2	J	0.053	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.033	1	ND	U	0.039	1	ND	U	0.041	1	ND	U	0.039	1	1.79		0.04	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.033	1	ND	U	0.039	1	ND	U	0.046	1	ND	U	0.044	1	ND	U	0.044	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.052	J	0.033	1	ND	U	0.039	1	ND	U	0.028	1	ND	U	0.026	1	ND	U	0.027	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.064	J	0.033	1	ND	U	0.039	1	ND	U	0.028	1	ND	U	0.027	1	ND	U	0.027	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	0.074	J	0.033	1	ND	U	0.039	1	ND	U	0.053	1	ND	U	0.051	1	ND	U	0.052	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.064	J	0.033	1	ND	U	0.039	1	ND	U	0.048	1	ND	U	0.046	1	0.0624	J	0.047	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.033	1	0.221		0.039	1	ND	U	0.042	1	ND	U	0.04	1	5.02		0.041	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	0.039	J	0.033	1	NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	0.074	J	0.001	46.04	0.362		0.039	1	1.18		0.046	1	ND	U	0.044	1	5.48		0.045	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.033	1	0.59		0.039	1	ND	U	0.036	1	ND	U	0.034	1	13		0.17	5
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.046	J	0.033	1	ND	U	0.039	1	ND	U	0.036	1	ND	U	0.035	1	1.11		0.035	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	NA				8.5		1.9	1	**2650**		0.94	5	8.5		0.15	1	5.6		0.15	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4_BH-13-81				AOI4-BH-13-82				AOI4-BH-13-84				AOI4-BH-13-85				AOI4-BH-13-86			
							Sample ID	AOI-4_BH-13-81_8-10'				AOI4-BH-13-82_6.5-7_031813				AOI4-BH-13-84_5.5-6_031513				AOI4-BH-13-85_5.5-6_031513				AOI4-BH-13-86_2-2.5_031513			
							Sample Date	41353.40972				41351.51042				41348.57292				41348.45833				41348.39583			
							Sample Interval (ft)	8-10				6.5-7				5.5-6				5.5-6				2-2.5			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00019	1	0.362	J	0.021	1	ND	U	0.00018	1	ND	U	0.00018	1	0.0437		0.00018	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00012	1	ND	U	**0.013**	1	ND	U	0.00011	1	ND	U	0.00011	1	ND	U	0.00011	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.013	1	ND	U	0.00012	1	ND	U	0.00012	1	ND	U	0.00011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00015	1	0.147	J	0.016	1	ND	U	0.00014	1	ND	U	0.00014	1	0.0169		0.00014	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00011	1	ND	U	0.012	1	ND	U	0.0001	1	ND	U	0.0001	1	ND	U	0.0001	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00013	1	0.339		0.014	1	ND	U	0.00012	1	ND	U	0.00012	1	0.0109		0.00012	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00024	1	0.186		0.026	1	ND	U	0.00023	1	ND	U	0.00023	1	0.0206		0.00022	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000068	1	0.129	J	0.0074	1	ND	U	0.000065	1	ND	U	0.000065	1	0.0143		0.000063	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00021	1	ND	U	0.023	1	ND	U	0.00021	1	ND	U	0.00021	1	ND	U	0.0002	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000096	1	ND	U	0.01	1	ND	U	0.000092	1	ND	U	0.000092	1	ND	U	0.000089	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.013	1	ND	U	0.014	1	ND	U	0.041	1	ND	U	0.042	1	ND	U	0.041	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.046	1	ND	U	0.047	1	ND	U	0.046	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.011	1	ND	U	0.012	1	ND	U	0.028	1	ND	U	0.028	1	ND	U	0.028	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.028	1	ND	U	0.029	1	ND	U	0.028	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.013	1	ND	U	0.015	1	ND	U	0.054	1	ND	U	0.055	1	ND	U	0.054	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.012	1	ND	U	0.014	1	ND	U	0.048	1	ND	U	0.049	1	ND	U	0.048	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.042	1	ND	U	0.043	1	ND	U	0.042	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.0099	1	ND	U	0.011	1	ND	U	0.046	1	ND	U	0.047	1	ND	U	0.046	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.016	1	ND	U	0.018	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.036	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.014	1	ND	U	0.016	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.036	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	2.5		0.13	1	13.3		0.14	1	6.6		0.17	1	6.9		0.19	1	7.8		0.18	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10 Reported result exceeds the PADEP Non-Residential Soil MSC
10 Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10 Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10 DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-86				AOI4-BH-13-88				AOI4-BH-13-88				AOI4-BH-13-89				AOI4_BH-13-90			
							Sample ID	AOI4-BH-13-86_5.5-6_031513				AOI4-BH-13-88_3.5-4_031413				AOI4-BH-13-88_5.5-6_031413				AOI4-BH-13-89_5.5-6_031913				AOI-4_BH-13-90_8-10'_031513			
							Sample Date	41348.41667				41347.48611				41347.5				41352.53125				41348.52083			
							Sample Interval (ft)	5.5-6				3.5-4				5.5-6				5.5-6				8-10			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00018	1	6.95		0.021	1	ND	U	0.00021	1	ND	U	0.0045	1	ND	U	0.00024	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00011	1	ND	U	**0.013**	1	ND	U	0.00013	1	ND	U	0.00089	1	ND	U	0.00015	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.014	1	ND	U	0.00014	1	ND	U	0.00089	1	ND	U	0.00016	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00014	1	ND	U	0.016	1	ND	U	0.00016	1	ND	U	0.0045	1	ND	U	0.00019	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0001	1	ND	U	0.012	1	ND	U	0.00012	1	ND	U	0.00089	1	ND	U	0.00014	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00012	1	ND	U	0.014	1	ND	U	0.00014	1	ND	U	0.00089	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00023	1	ND	U	0.026	1	ND	U	0.00027	1	ND	U	0.00089	1	ND	U	0.0003	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000065	1	0.993		0.0075	1	ND	U	0.000076	1	ND	U	0.0045	1	ND	U	0.000086	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.00021	1	ND	U	0.024	1	ND	U	0.00024	1	ND	U	0.00089	1	ND	U	0.00027	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000092	1	ND	U	0.011	1	ND	U	0.00011	1	ND	U	0.00089	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.039	1	ND	U	0.04	1	ND	U	0.04	1	ND	U	0.037	1	ND	U	0.042	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	0.0692	J	0.044	1	ND	U	0.045	1	ND	U	0.045	1	ND	U	0.037	1	ND	U	0.047	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	0.0431	J	0.026	1	ND	U	0.027	1	ND	U	0.027	1	ND	U	0.037	1	ND	U	0.028	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	0.122		0.027	1	ND	U	0.028	1	ND	U	0.028	1	ND	U	0.037	1	ND	U	0.029	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.051	1	ND	U	0.053	1	ND	U	0.052	1	ND	U	0.037	1	ND	U	0.055	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	0.0634	J	0.046	1	ND	U	0.047	1	ND	U	0.047	1	ND	U	0.037	1	ND	U	0.049	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.04	1	ND	U	0.041	1	ND	U	0.041	1	ND	U	0.037	1	ND	U	0.043	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.044	1	0.894		0.045	1	ND	U	0.045	1	ND	U	0.037	1	ND	U	0.047	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.107	J	0.034	1	0.393		0.035	1	ND	U	0.035	1	ND	U	0.037	1	ND	U	0.037	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.147		0.034	1	ND	U	0.036	1	ND	U	0.036	1	ND	U	0.037	1	ND	U	0.037	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	**2140**		0.9	5	7.1		0.19	1	6.2		0.19	1	6.7		2	1	8.6		0.19	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-91				AOI4-BH-13-92				AOI4-BH-13-93				AOI4_BH-13-94				AOI4-BH-13-95			
							Sample ID	AOI4-BH-13-91_8-10'_031413				AOI4-BH-13-92_8-10'				AOI4-BH-13-93_8-10'				AOI-4_BH-13-94_8-10_031513				AOI4-BH-13-95_8-10'			
							Sample Date	41347.53125				41351.39583				41351.5625				41348.375				41351.45833			
							Sample Interval (ft)	8-10				8-10				8-10				8-10				8-10			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00018	1	ND	U	0.00019	1	ND	U	0.00016	1	ND	U	0.00023	1	ND	U	0.00019	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00011	1	ND	U	0.00011	1	ND	U	0.000098	1	ND	U	0.00014	1	ND	U	0.00011	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00012	1	ND	U	0.00012	1	ND	U	0.0001	1	ND	U	0.00015	1	ND	U	0.00012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.00014	1	ND	U	0.00014	1	ND	U	0.00012	1	ND	U	0.00018	1	ND	U	0.00014	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0001	1	ND	U	0.00011	1	ND	U	0.000092	1	ND	U	0.00013	1	ND	U	0.00011	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00012	1	ND	U	0.00012	1	ND	U	0.00011	1	ND	U	0.00015	1	ND	U	0.00013	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00022	1	ND	U	0.00023	1	ND	U	0.0002	1	ND	U	0.00029	1	ND	U	0.00024	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000063	1	ND	U	0.000066	1	ND	U	0.000057	1	ND	U	0.000082	1	ND	U	0.000067	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.0002	1	ND	U	0.00021	1	ND	U	0.00018	1	ND	U	0.00026	1	ND	U	0.00021	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.000089	1	ND	U	0.000094	1	ND	U	0.000081	1	ND	U	0.00012	1	ND	U	0.000095	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.038	1	ND	U	0.025	2	ND	U	0.013	1	ND	U	0.042	1	ND	U	0.012	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.043	1	ND	U	0.023	2	ND	U	0.012	1	ND	U	0.047	1	ND	U	0.011	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.026	1	ND	U	0.022	2	ND	U	0.011	1	ND	U	0.028	1	ND	U	0.01	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.027	1	ND	U	0.024	2	ND	U	0.012	1	ND	U	0.029	1	ND	U	0.011	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.05	1	ND	U	0.026	2	ND	U	0.013	1	ND	U	0.055	1	ND	U	0.012	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.045	1	ND	U	0.024	2	ND	U	0.012	1	ND	U	0.049	1	ND	U	0.011	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.039	1	ND	U	0.023	2	ND	U	0.012	1	ND	U	0.043	1	ND	U	0.011	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.043	1	ND	U	0.019	2	ND	U	0.0099	1	ND	U	0.047	1	ND	U	0.0091	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.034	1	ND	U	0.032	2	ND	U	0.016	1	ND	U	0.037	1	ND	U	0.015	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.034	1	ND	U	0.027	2	ND	U	0.014	1	ND	U	0.037	1	ND	U	0.013	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	7.3		0.17	1	11.6		0.13	1	10.7		0.13	1	6.2		0.19	1	5.5		0.13	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-96				AOI4-BH-13-97				AOI4-BH-13-98				AOI4-BH-13-99				AOI4-BH-13-100			
							Sample ID	AOI4-BH-13-96_8-9_31413				AOI4-BH-13-97-8.5-9.5_31413				AOI4-BH-13-98_6-7_31413				AOI4-BH-13-99_2.5-3_031813				AOI4-BH-13-100_5-6_31813			
							Sample Date	41347.38889				41347.45486				41347.49306				41351.61458				41351.45486			
							Sample Interval (ft)	8-9				8.5-9.5				6-7				2.5-3				5-6			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																											
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	0.145	J	0.017	1	ND	U	0.00021	1	1.15		0.021	1	0.169	J	0.03	1	ND	U	0.00024	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	**0.011**	1	ND	U	0.00013	1	ND	U	0.00012	1	ND	U	**0.018**	1	ND	U	0.00014	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.011	1	ND	U	0.00014	1	ND	U	0.00013	1	ND	U	0.02	1	ND	U	0.00015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	0.189	J	0.013	1	ND	U	0.00016	1	0.0948		0.00015	1	0.0611	J	0.023	1	ND	U	0.00018	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.0099	1	ND	U	0.00012	1	0.127		0.00011	1	0.245		0.017	1	ND	U	0.00014	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	0.26		0.012	1	ND	U	0.00014	1	2.42		0.014	1	0.671		0.02	1	ND	U	0.00016	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	0.0535	J	0.022	1	ND	U	0.00026	1	0.581		0.026	1	0.11	J	0.038	1	ND	U	0.0003	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	0.143	J	0.0062	1	ND	U	0.000075	1	0.015		0.000071	1	0.122	J	0.011	1	ND	U	0.000085	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.02	1	ND	U	0.00024	1	ND	U	0.00023	1	ND	U	0.034	1	ND	U	0.00027	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	0.0472	J	0.0087	1	ND	U	0.00011	1	0.702		0.01	1	0.182		0.015	1	ND	U	0.00012	1
Semi Volatile Organic Compounds																											
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.039	1	ND	U	0.036	1	ND	U	0.041	1	ND	U	0.013	1	ND	U	0.013	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.043	1	ND	U	0.04	1	ND	U	0.046	1	0.0652		0.012	1	ND	U	0.012	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.026	1	ND	U	0.024	1	ND	U	0.027	1	0.0875		0.011	1	ND	U	0.011	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.027	1	ND	U	0.025	1	ND	U	0.028	1	0.0954		0.012	1	ND	U	0.012	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.051	1	ND	U	0.047	1	ND	U	0.053	1	0.109		0.014	1	ND	U	0.014	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.046	1	ND	U	0.042	1	ND	U	0.048	1	0.114		0.012	1	ND	U	0.012	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	0.181		0.04	1	ND	U	0.037	1	ND	U	0.042	1	0.191		0.012	1	ND	U	0.012	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.044	1	ND	U	0.04	1	ND	U	0.046	1	0.0933		0.01	1	ND	U	0.01	1
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	0.282		0.034	1	ND	U	0.031	1	ND	U	0.036	1	0.38		0.017	1	ND	U	0.017	1
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	0.0538	J	0.034	1	ND	U	0.032	1	ND	U	0.036	1	0.14		0.014	1	ND	U	0.014	1
Metals																											
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	26.2		0.17	1	2.9		0.17	1	8		0.19	1	**1870**		0.14	1	12.8		0.14	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

U - The analyte was analyzed but not detected above the detection limit.
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

Table 3
Summary of Subsurface Soil Analytical Results
AOI 4
PES Facility
Philadelphia, Pennsylvania

Chemical Name	CAS Number	PADEP Non-Res Subsurface Soil Direct Contact MSC[1]	PADEP Non-Res Soil to GW MSC[2]	PADEP Non-Res Subsurface Soil MSC[3]	EPA Industrial Soil RSL[4]	PADEP Non-Res Surface Soil Direct Contact MSC[5]	Location	AOI4-BH-13-101				AOI4-BH-13-102				AOI4-BH-13-103				AOI4-BH-13-104			
							Sample ID	AOI4-BH-13-101_7-8_31813				AOI4-BH-13-102_6-7_31813				AOI4-BH-13-103_2-3_31813				AOI4-BH-13-104_6-7_31513			
							Sample Date	41351.42361				41351.37847				41351.34722				41348.43403			
							Sample Interval (ft)	7-8				6-7				2-3				6-7			
							Sample Purpose	Site Characterization				Site Characterization				Site Characterization				Site Characterization			
							Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds																							
1,2,4-Trimethylbenzene	95-63-6	640	35	35	260	560	mg/kg	ND	U	0.00026	1	ND	U	0.00021	1	ND	U	0.00023	1	**75.4**		0.23	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	0.005	0.005	0.17	3.7	mg/kg	ND	U	0.00016	1	ND	U	0.00013	1	ND	U	0.00014	1	ND	U	**0.035**	1
1,2-Dichloroethane	107-06-2	98	0.5	0.5	2.2	86	mg/kg	ND	U	0.00017	1	ND	U	0.00014	1	ND	U	0.00015	1	ND	U	0.037	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	550	9.3	9.3	10000	480	mg/kg	ND	U	0.0002	1	ND	U	0.00016	1	ND	U	0.00018	1	**27.3**		0.044	1
Benzene	71-43-2	330	0.5	0.5	5.4	290	mg/kg	ND	U	0.00015	1	ND	U	0.00012	1	ND	U	0.00013	1	**1.96**		0.032	1
Dimethyl Benzene/ Xylenes, Total	1330-20-7	9100	1000	1000	2700	8000	mg/kg	ND	U	0.00018	1	ND	U	0.00014	1	ND	U	0.00015	1	65.6		0.038	1
Ethylbenzene	100-41-4	10000	70	70	27	10000	mg/kg	ND	U	0.00033	1	ND	U	0.00026	1	ND	U	0.00029	1	29.5		0.072	1
Isopropylbenzene (Cumene)	98-82-8	10000	2500	2500	11000	10000	mg/kg	ND	U	0.000094	1	ND	U	0.000074	1	ND	U	0.000082	1	7.31		0.02	1
Tert-Butyl Methyl Ether	1634-04-4	3700	2	2	220	3200	mg/kg	ND	U	0.0003	1	ND	U	0.00024	1	ND	U	0.00026	1	ND	U	0.064	1
Toluene	108-88-3	10000	100	100	45000	10000	mg/kg	ND	U	0.00013	1	ND	U	0.00011	1	ND	U	0.00012	1	6.55		0.029	1
Semi Volatile Organic Compounds																							
Anthracene	120-12-7	190000	350	350	170000	190000	mg/kg	ND	U	0.014	1	ND	U	0.013	1	ND	U	0.014	1	2.56		0.042	1
Benzo(A)Anthracene	56-55-3	190000	320	320	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.047	1
Benzo(A)Pyrene	50-32-8	190000	46	46	0.21	11	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.012	1	ND	U	0.028	1
Benzo(B)Fluoranthene	205-99-2	190000	170	170	2.1	110	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.013	1	ND	U	0.029	1
Benzo(G,H,I)Perylene	191-24-2	190000	180	180	NS	170000	mg/kg	ND	U	0.015	1	ND	U	0.014	1	ND	U	0.015	1	ND	U	0.055	1
Chrysene	218-01-9	190000	230	230	210	11000	mg/kg	ND	U	0.014	1	ND	U	0.013	1	ND	U	0.014	1	ND	U	0.049	1
Fluorene	86-73-7	190000	3800	3800	22000	110000	mg/kg	ND	U	0.013	1	ND	U	0.012	1	ND	U	0.013	1	6.14		0.043	1
Indeno(1,2,3-C,D)Pyrene	193-39-5	190000	28000	28000	2.1	110	mg/kg	NA				NA				NA				NA			
Naphthalene	91-20-3	190000	25	25	18	56000	mg/kg	ND	U	0.011	1	ND	U	0.01	1	ND	U	0.011	1	21.2		0.23	5
Phenanthrene	85-01-8	190000	10000	10000	NS	190000	mg/kg	ND	U	0.018	1	ND	U	0.017	1	0.0341	J	0.018	1	21.7		0.18	5
Pyrene	129-00-0	190000	2200	2200	17000	84000	mg/kg	ND	U	0.015	1	ND	U	0.014	1	ND	U	0.015	1	0.697		0.037	1
Metals																							
Lead	7439-92-1	190000	450	450	800	1000	mg/kg	10.2		0.12	1	9.2		0.12	1	34		0.11	1	7.9		0.19	1

Notes:

[1] PADEP Non-Residential Direct Contact MSC for subsurface soils (2-15 feet below ground surface) (last updated Jan. 2011).
[2] PADEP Non-Residential Soil to Groundwater MSC for unsaturated soils in a used aquifer with total dissolved solids less than 2500 mg/l (last updated Jan. 2011).
[3] Criteria shown in gray were used to determine the non-residential soil MSCs used to screen the sample results. The lowest, most conservative, value of the soil-to-groundwater or direct contact criteria was used as the value for screening purposes.
[4] EPA Industrial Soil Regional Screening Level (last updated Nov 2012).
[5] PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated Jan. 2011).
CAS - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection
mg/kg - milligram per kilogram
ft - Feet
MSC - Medium Specific Concentration
DL - Lab detection limit (actual limit may be either the quantification or method detection limit)
ND - Not Detected
DF - Dilution Factor
Q - Lab Qualifier
NA - Not Analyzed
NS - No Standard
Result screened against PADEP Surface Soil Direct Contact MSC only if the result also exceeds the PADEP Soil MSC and EPA RSL.

Qualifiers:

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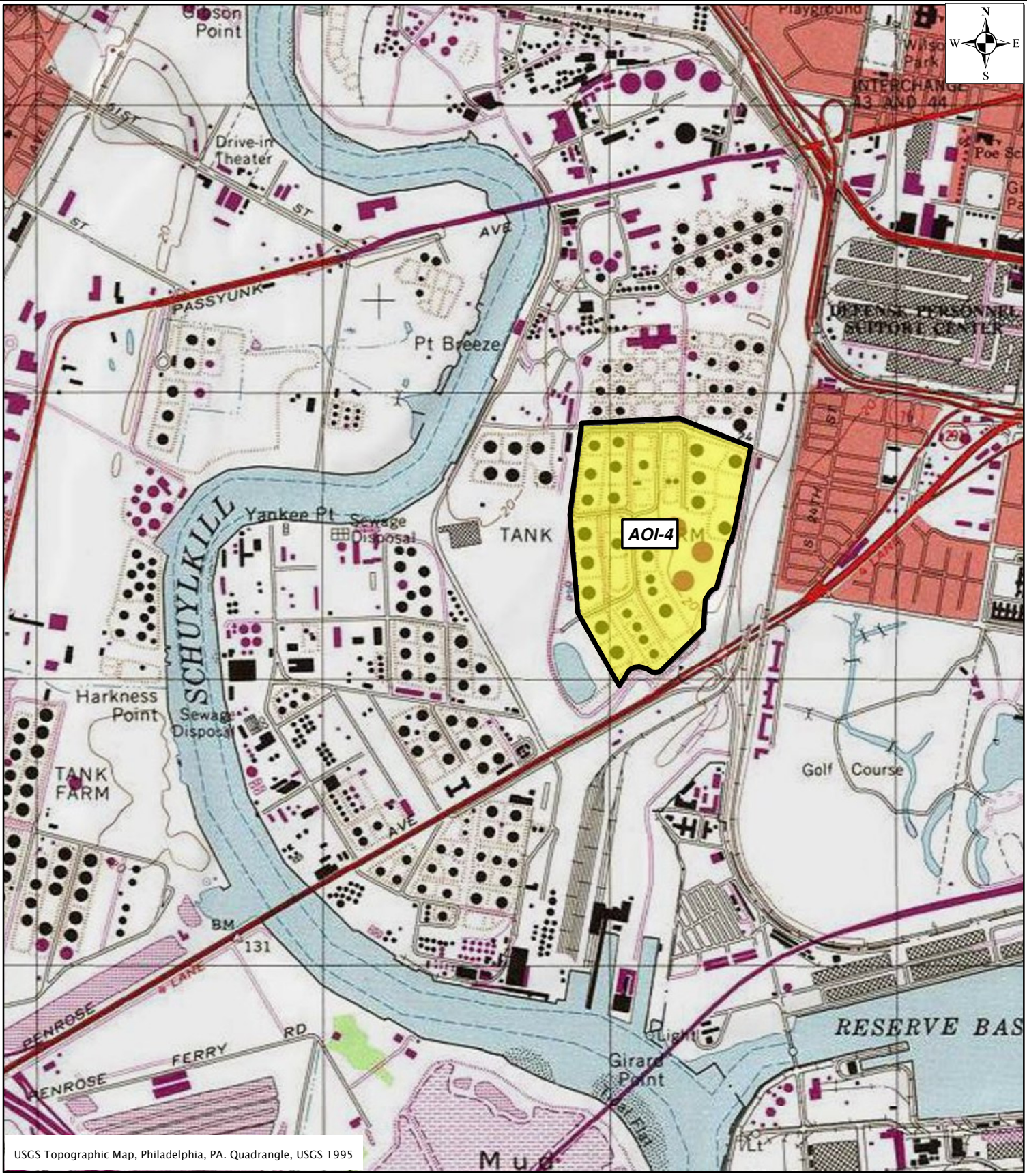
J - Compound was detected below the quantification limit and above the method detection limit. The result should be considered estimated.
D - Sample was diluted.
UD -The analyte was analyzed but not detected above the detection limit . The sample was diluted.

Exceedance Summary:

10	Reported result exceeds the PADEP Non-Residential Soil MSC
10	Reported result exceeds the PADEP Soil MSC and the EPA Industrial Soil RSL
10	Reported result exceeds the PADEP MSC, EPA Industrial Soil RSL, and PADEP Surface Soil Direct Contact MSC
10	DL of non-detected compounds exceeds the PADEP Non-Residential Soil MSC

FIGURES



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

SUNOCO

PHILADELPHIA ENERGY SOLUTIONS

Sunoco, Inc. (R&M)

PES Facility

3144 Passyunk Avenue
Philadelphia, PA. 19145

Figure 1: Site Location Map
AOI-4 Supplemental
Site Characterization/
Remedial Investigation Report
PES Facility

Philadelphia Pennsylvania

Job Number	Scale: 1" = 1,500'	Date
2574601	0 750 1,500 Feet	October 1, 2013

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 1- Site Location Map_10-1-13.mxd

AOI-2

AOI-1

AOI-4

AOI-3

843

844

849

881

845

846

847

880

885

826

N

W

E

S

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

Legend

271 Tank Closed in Place

270 Tank With Release Assessment

846 Closed in Place Following Release

Area of Interest (AOI) Boundary

Figure 2: Site Plan
AOI-4 Supplemental
Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

SUNOCO

PHILADELPHIA ENERGY SOLUTIONS

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: PT
JOB#: 257460 1

Path: \\langan.com\data\DT\data6\257460 1\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 2 - AOI-4 Site Plan_10-7-13.mxd

AOI-1
AOI-2
AOI-3
AOI-4
N
W
E
S
P
P'
S-102
S-59D
S-366
S-368
S-104
S-103
S-367
S-55
S-369
S-225
S-364
S-229
S-111
S-365
S-282
S-216
S-379
S-119D
S-119
S-40
MW-1
MW-4
S-56
S-96
MW-3
S-380
S-57
S-35
S-34
S-36
S-37
S-33
S-120
S-121
S-217
S-218
S-39
S-32
S-370
S-219
S-371
S-30
S-29
S-31
S-28
S-381
S-97
S-122
S-372
S-123
S-38
S-38D
S-38D2
S-220
S-27
S-279
S-244
S-241
S-245
S-221
S-236
S-246
S-240
S-237
RW-700
RW-701
S-224
RW-702
S-233
RW-703
S-238
RW-705
RW-704
S-124
RW-706
RW-707
S-223
S-235
RW-708
S-242
RW-710
RW-709
RW-711
S-239
S-234
RW-712
S-278
S-26
RW-713
RW-714
S-243
S-329
RW-716
RW-715
S-222
RW-717

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

Legend

- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate
- P — P' Cross Section Location
- Area of Interest (AOI) Boundary

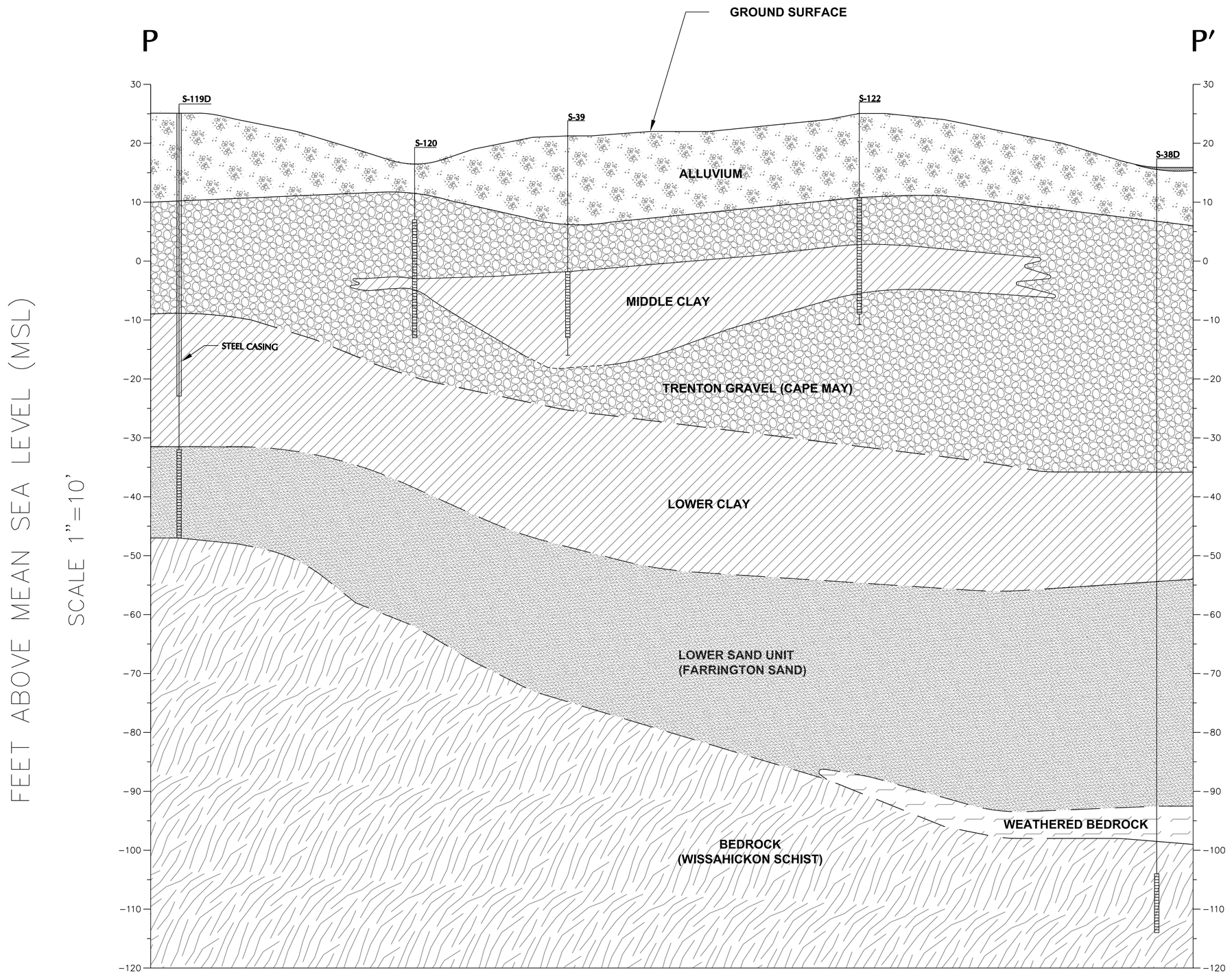
Figure 3: Cross Section Location Plan
AOI-4 Supplemental
Site Characterization/
Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 14, 2013
DRN. BY: MH
CKD. BY: PT
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 3 - Cross Section Location Plan_10-1-13.mxd



LEGEND

- FILL
- ALLUVIUM
- SAND AND GRAVEL
- CLAY/SILT AND SOME SAND
- SAND
- WEATHERED BEDROCK
- BEDROCK
- S-119D WELL ID
- WELL SCREEN

10 0 2 4 10
VERTICAL SCALE IN FEET

100 0 50 100
HORIZONTAL SCALE IN FEET

SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

Project
SUNOCO, INC. (R & M)
PES FACILITY
3144 PASSYUNK AVENUE
PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title
GEOLOGIC CROSS SECTION P-P′

Project No. 2574601	Drawing No. 4
Date 14 AUGUST 13	
Scale AS SHOWN	
Drn. By AJC	
Last Revised 25 AUGUST 05	1 Of 1

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Filename: \\langan.com\data\DT\data6\2574601\Cadd Data – 2574601\Dwg\Environmental\Figure4_P-P'_130813.dwg Date: 10/1/2013 Time: 10:17 User: mmking Style Table: Langan.stb Layout: E Size Sheet (Bottom)



Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. LNAPL occurence based on June 2013 gauging event.
3. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Legend

- Shallow Monitoring Well with Apparent LNAPL Thickness (ft.)
- Shallow/Intermediate Monitoring Well with Apparent LNAPL Thickness (ft.)
- Intermediate Monitoring Well with Apparent LNAPL Thickness (ft.)
- Intermediate Recovery Well with Apparent LNAPL Thickness (ft.)
- Shallow Monitoring Well with No Exceedance of PADEP Non-Res GW MSCs
- Shallow Monitoring Well Location with No Exceedance of PADEP Non-Res GW MSCs (see Note 2)
- Shallow Monitoring Well Location with Exceedance of PADEP Non-Res GW MSCs

- Shallow Monitoring Well Location
- Shallow/Intermediate Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Intermediate Recovery Well Location
- Damaged/Abandoned/Unable to Locate

S-329
S-329_06_17_2013
VOCs in ug/L
Benzene - 8.6

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

- 271 Tank Closed in Place
- 270 Tank With Release Assessment
- 846 Closed in Place Following Release
- Groundwater Elevation Contour (ft.)
- Inferred Groundwater Elevation Contour (ft.)

LNAPL Types
- Middle Distillate
- AOIs

Figure 5: Shallow Groundwater Conditions in AOI -4
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

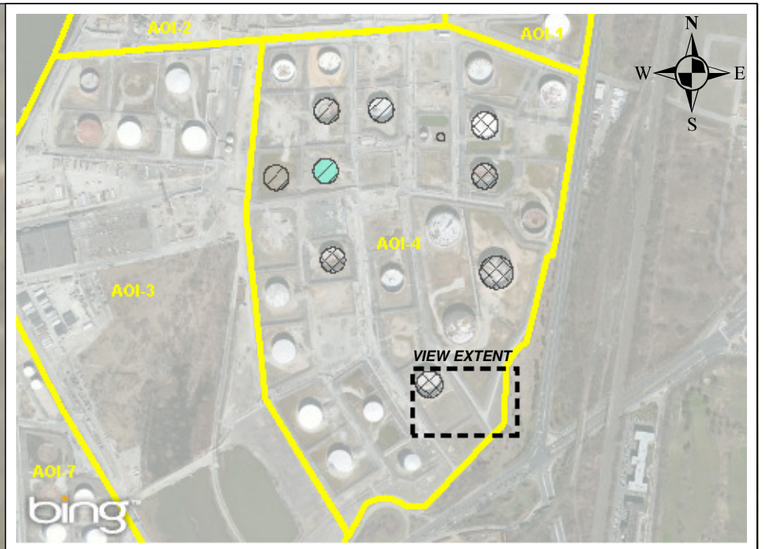
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 55 110 220 Feet

SCALE: 1" = 110'
DATE: August 15, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 5 - Shallow Groundwater Conditions in AOI 4_10-1-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- Tank Closed in Place
- Tank With Release Assessment
- Closed in Place Following Release

PB-252-SUB-2 PB-252-SUB-2_05302007 *VOCs in mg/kg* Benzene - 4.7	**Well ID** System Sample Name *Type of Exceedance* Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Figure 6: AST PB 826 Soil Sample Locations and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

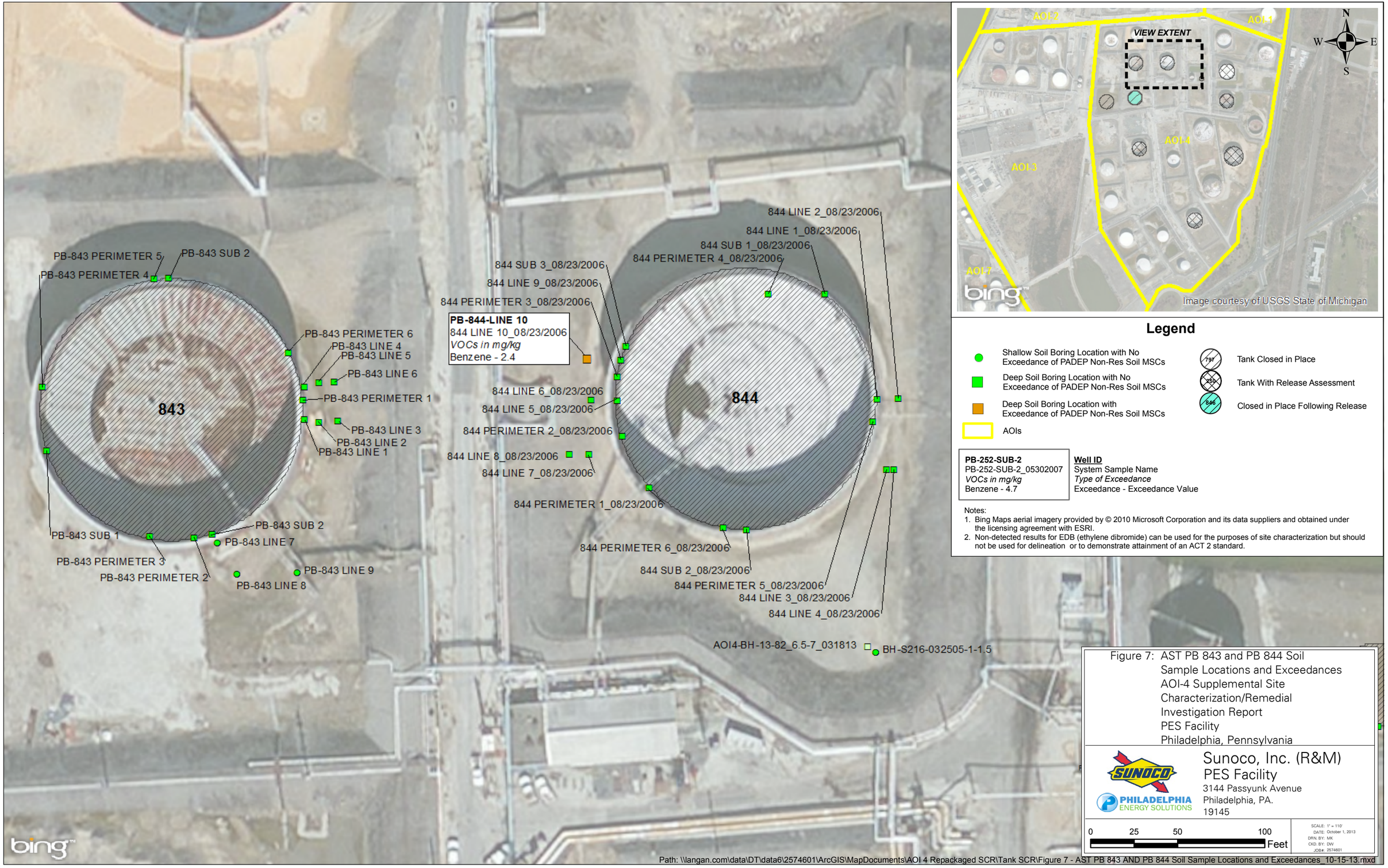
SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

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

0 20 40 80 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 6 - AST PB 826 Soil Sample Locations and Exceedances 10-1-13.mxd



Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- Tank Closed in Place
- Tank With Release Assessment
- Closed in Place Following Release

PB-252-SUB-2
PB-252-SUB-2_05302007
VOCs in mg/kg
Benzene - 4.7

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

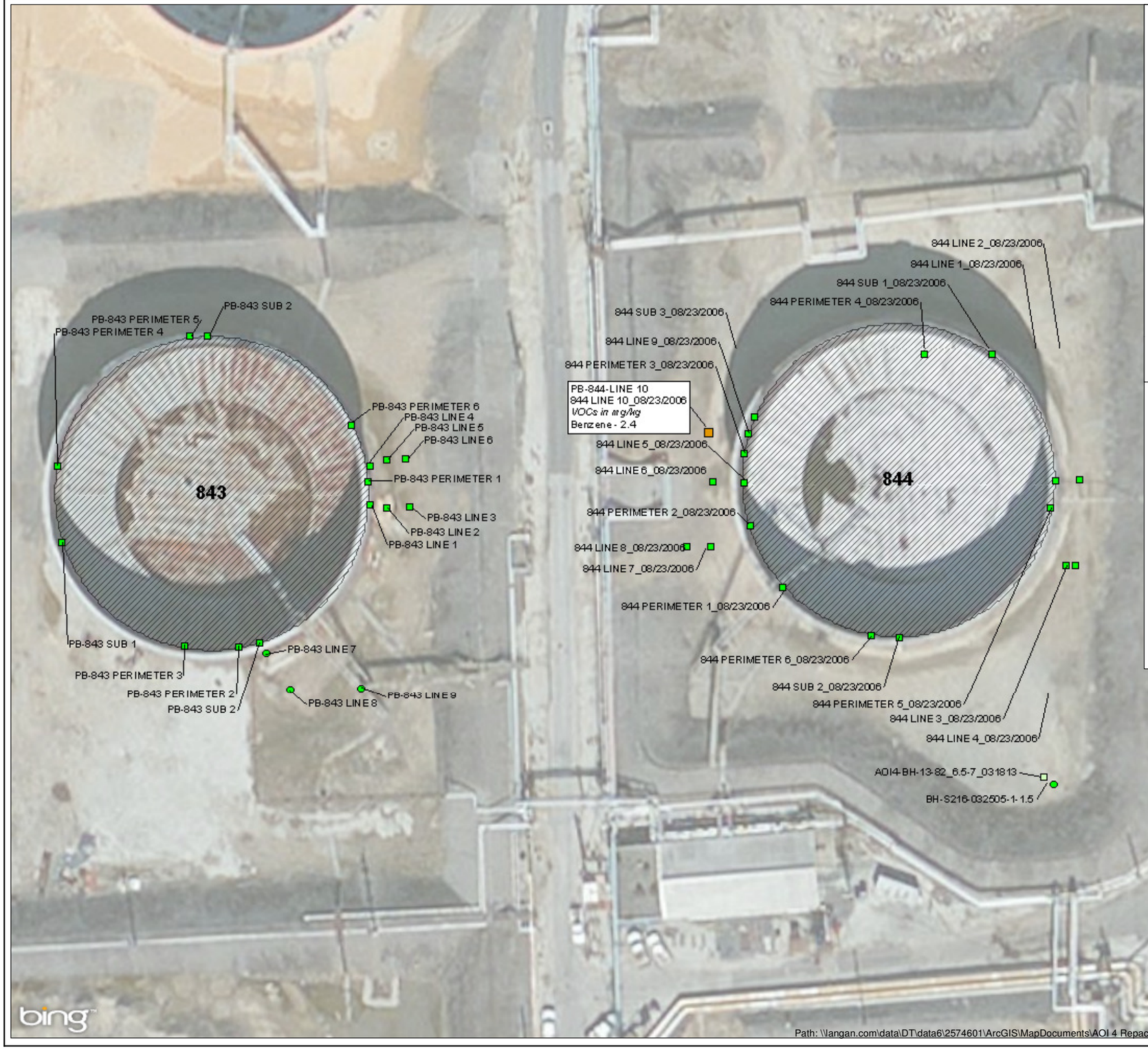
Figure 7: AST PB 843 and PB 844 Soil Sample Locations and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

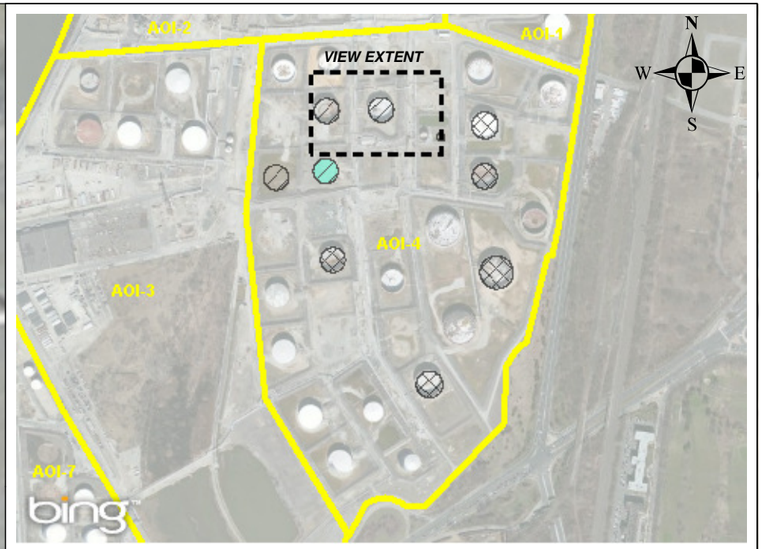
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 25 50 100 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 7 - AST PB 843 AND PB 844 Soil Sample Locations and Exceedances_10-15-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- Tank Closed in Place
- Tank With Release Assessment
- Closed in Place Following Release

PB-252-SUB-2
PB-252-SUB-2_05302007
VOCs in mg/kg
Benzene - 4.7

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Figure 7: AST PB 843 and PB 844 Soil Sample Locations and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

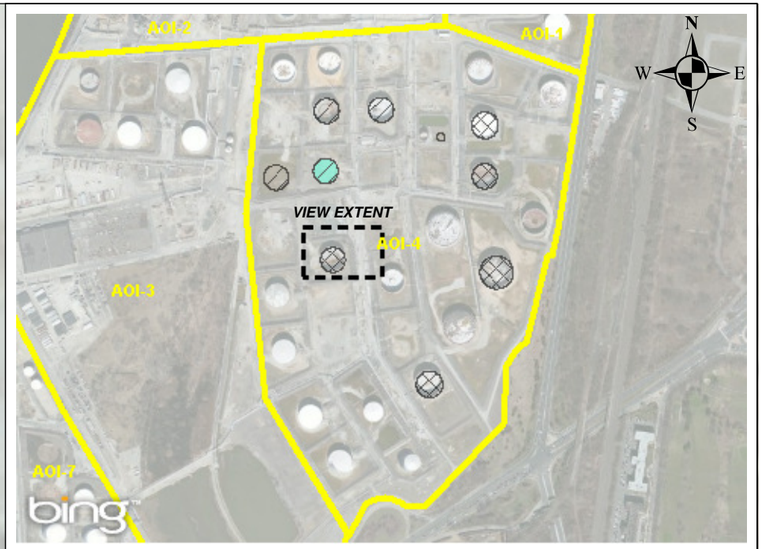
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 25 50 100 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 7 - AST PB 843 AND PB 844 Soil Sample Locations and Exceedances 10-1-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- 797 — Tank Closed in Place
- 250 — Tank With Release Assessment
- 846 — Closed in Place Following Release

PB-252-SUB-2
PB-252-SUB-2_05302007
VOCs in mg/kg
Benzene - 4.7

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Figure 9: AST PB 847 Soil Sample Locations and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

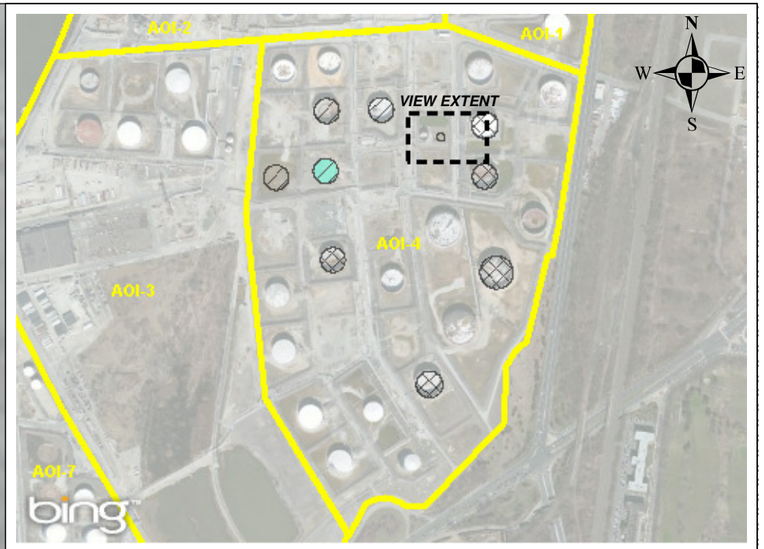
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 15 30 60 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 9 - AST PB 847 Soil Sample Locations and Exceedances 10-1-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- Tank Closed in Place
- Tank With Release Assessment
- Closed in Place Following Release

PB-252-SUB-2
PB-252-SUB-2_05302007
VOCs in mg/kg
Benzene - 4.7

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

881-1_10/26/2005
881-2_10/26/2005
881-3_10/26/2005

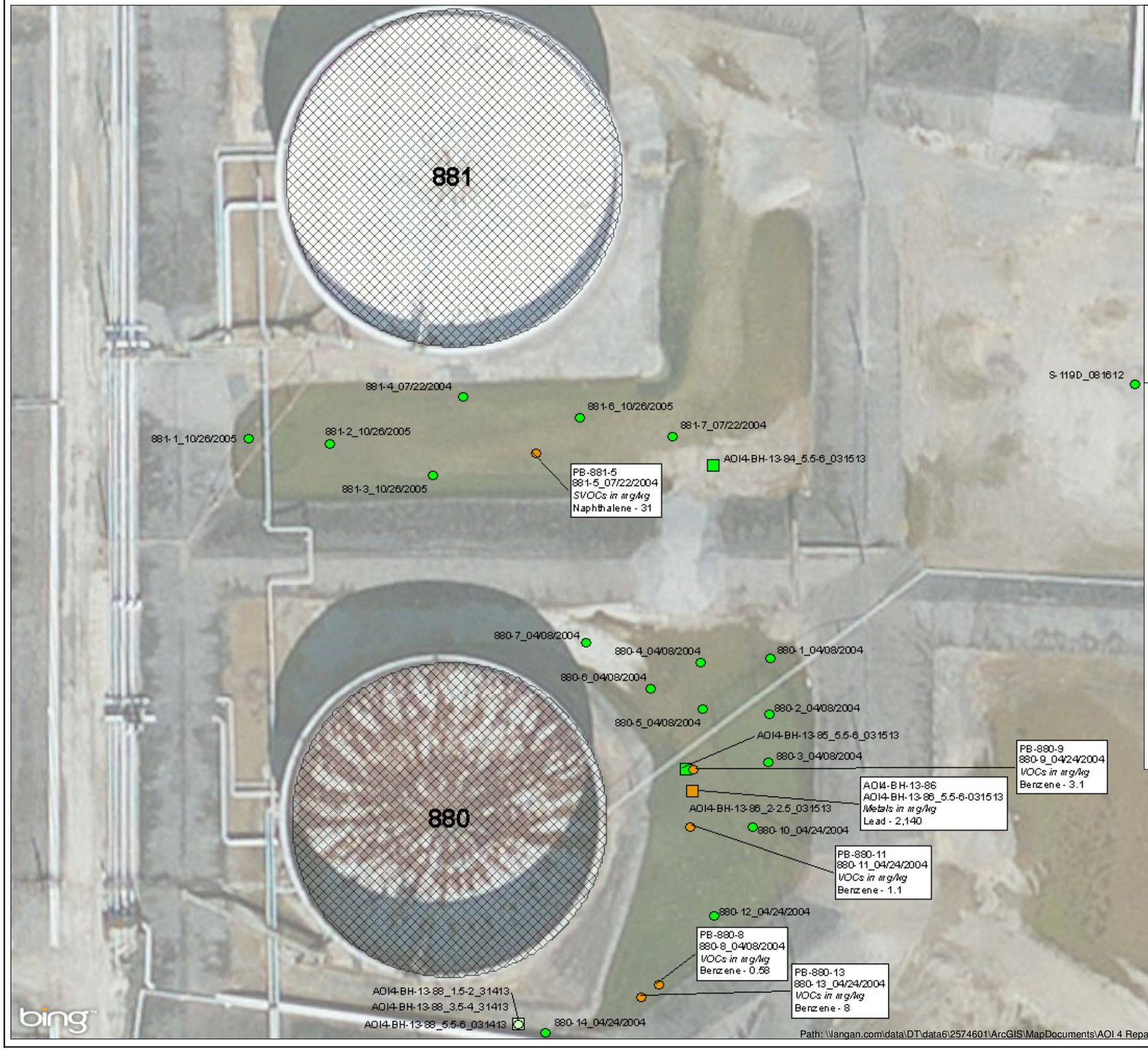
Figure 10:AST PB 849 Soil Sample Locations and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

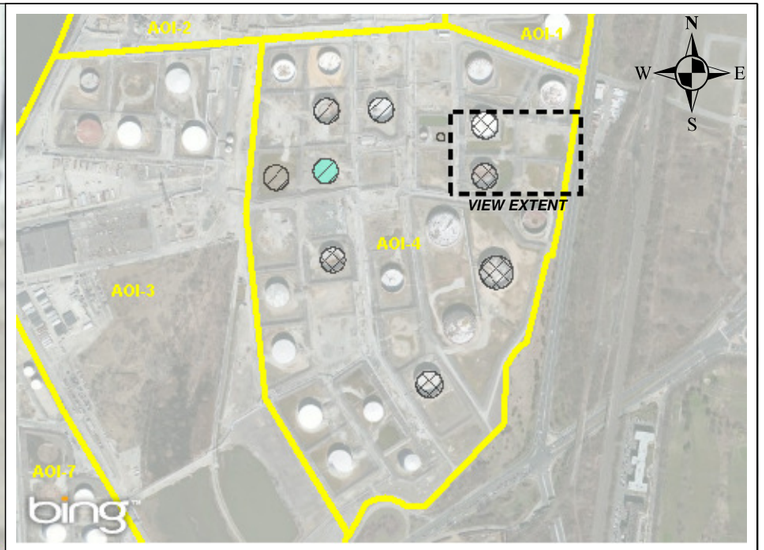
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 15 30 60 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 10 - AST PB 849 Soil Sample Locations and Exceedances 10-1-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs (See Note 3)
- Shallow Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs (See Note 3)
- Deep Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- AOIs

- 797 — Tank Closed in Place
- 250 — Tank With Release Assessment
- 846 — Closed in Place Following Release

PB-880-9
880-9_04/24/2004
VOCs in mg/kg
Benzene - 3.1

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. MSCs for Benzene, Toluene, and Naphthalene were exceeded in sample PB-880-SURFACE_04/08/2004 (as seen in Table 4-Summary of Surface and Soil Analytical Results) . The exact coordinates of this sample are unknown
2. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
3. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Figure 11:AST PB 880 and PB 881 Soil Sample Locaitons and Exceedances
AOI-4 Supplemental Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

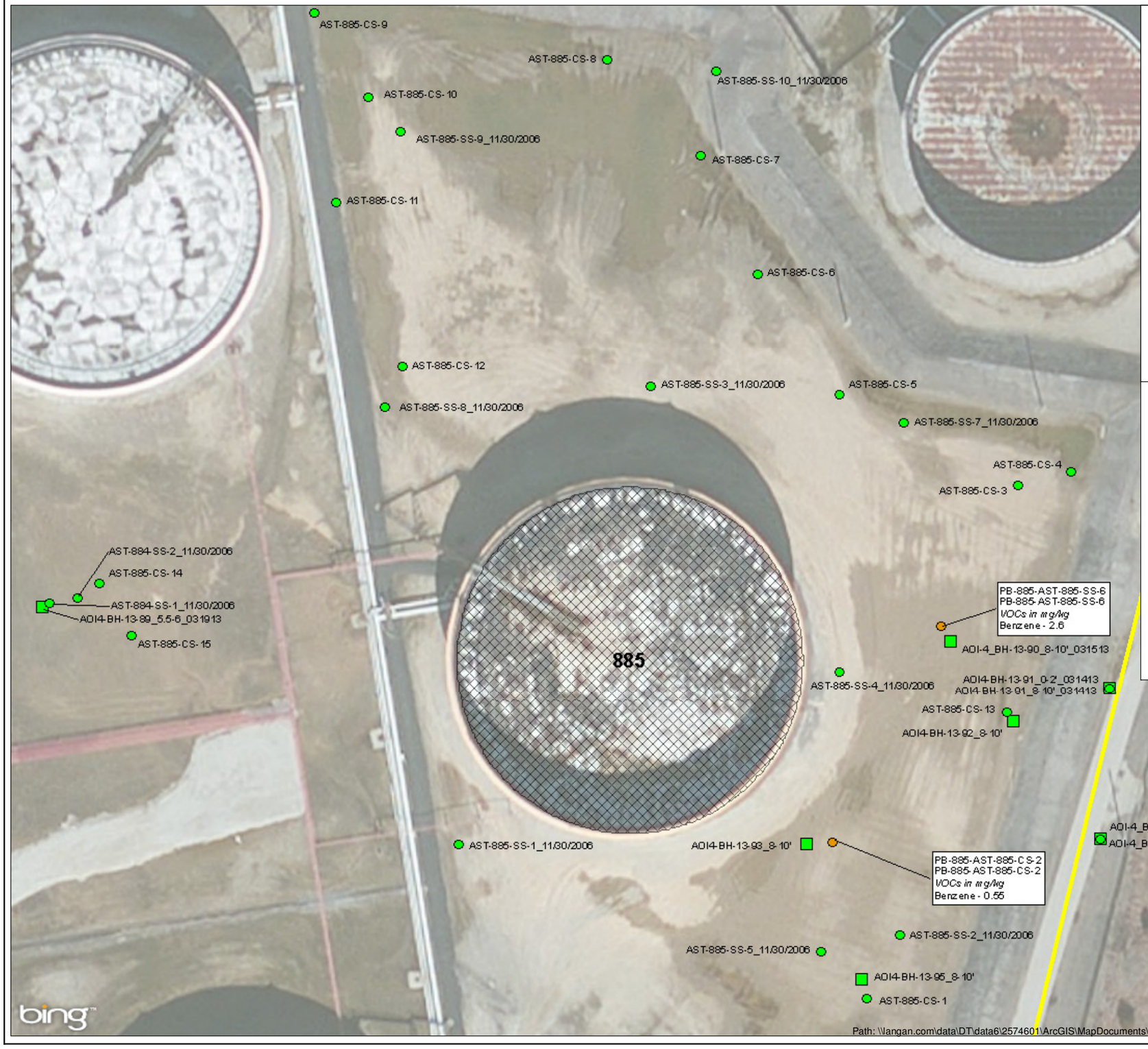
SUNOCO
PHILADELPHIA ENERGY SOLUTIONS

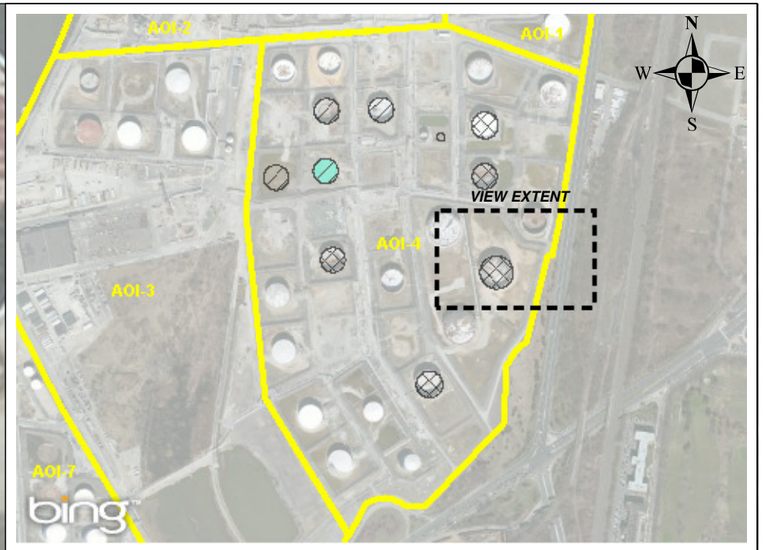
Sunoco, Inc. (R&M)
PES Facility
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 25 50 100 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DV
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 11 - ASTs PB 880 and PB 881 Soil Sample Locations and Exceedances 10-1-13.mxd





Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- Shallow Soil Boring Location with Exceedance of PADEP Non-Res Soil MSCs
- Deep Soil Boring Location with No Exceedance of PADEP Non-Res Soil MSCs
- AOIs
- Tank Closed in Place
- Tank With Release Assessment
- Closed in Place Following Release

PB-885-A ST-885-C S-2
PB-885-A ST-885-C S-2
VOCs in mg/kg
Benzene - 0.55

Well ID
System Sample Name
Type of Exceedance
Exceedance - Exceedance Value

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Non-detected results for EDB (ethylene dibromide) can be used for the purposes of site characterization but should not be used for delineation or to demonstrate attainment of an ACT 2 standard.

Figure 12: AST PB 885 Soil Sample Locations and Exceedances
AOI-4 Re-packaged Site Characterization/Remedial Investigation Report
PES Facility
Philadelphia, Pennsylvania

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

0 30 60 120 Feet

SCALE: 1" = 110'
DATE: October 1, 2013
DRN. BY: MK
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Tank SCR\Figure 12 - AST PB 885 Soil Sample Locations and Exceedances 10-1-13.mxd

APPENDIX A

PADEP Correspondence

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
February 26, 2008

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

RECEIVED
FEB 29 2008
By

Mr. Scott A. Baker, P.E.
Sunoco, Inc.
3144 Passyunk Avenue
Philadelphia, PA 19145

Re: Storage Tank Program
Facility ID No. 51-36558 & 51-19781
Sunoco Girard Point & Point Breeze Facilities
3144 Passyunk Avenue
Philadelphia County

Dear Mr. Baker:

Over the past few years, we have received documents from you that mention how Sunoco considers certain regulated storage tank release incidents to be covered by the 2003 Consent Order & Agreement (CO&A) between the Department and Sunoco, Inc. The purpose of this letter is to clarify for you which release incidents at the two above-mentioned facilities are covered under the 2003 CO&A. Paragraph 8 of the CO&A states that release incidents associated with a closure or change-in-service of an aboveground storage tank (AST) are covered by the CO&A. Thus, incidents not involving a tank closure or change-in-service are not covered.

All incidents occurring at these two facilities in the past few years (since we have been actively tracking regulated storage tank releases) are listed in the two tables below. There are multiple incidents that have occurred at these two facilities prior to our tracking of releases, which are not listed in the tables below and were not adequately addressed. Please be sure to address those releases incidents as well in accordance with either the CO&A or the corrective action process detailed in the storage tank regulations (25 Pa. Code Chapter 245 Subchapter D).

Please note that the CO&A does state that corrective actions required by Chapter 245 Sections 304, 305, 306, and 307 must still be completed for any AST closure and change-in-service.

Release incidents covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	1002	139A	4-7-06
Girard Point	1100	140A	5-31-06
Girard Point	277	039A	6-25-07
Girard Point	1208	025A	6-28-07
Point Breeze	119	024A	4-7-06
Point Breeze	182	048A	5-31-06
Point Breeze	181	047A	6-22-07
Point Breeze	848	116A	6-25-07
Point Breeze	252	055A	6-28-07

Release incidents NOT covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	250	030A	1-27-07
Girard Point	T-201	175A	12-10-07
Girard Point	1088	089A	12-31-07
Point Breeze	881	120A	9-3-05
Point Breeze	140	031A	9-15-05
Point Breeze	847	115A	9-3-06
Point Breeze	885	124A	10-15-06

The Department realizes that several corrective action reports have been submitted for some of the above-listed incidents which are not covered by the CO&A. We will issue a response for those reports. All incidents covered by the CO&A will be "administratively closed out" on our eFACTS database with a comment stating that the release will be addressed under the CO&A.

This letter is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

Sincerely,

Heidi J. Kunsch
Water Quality Specialist
Environmental Cleanup

cc: Philadelphia Health Department
Mr. Higgins, Philadelphia L&I
Mr. Stan Sneath, PADEP
Mr. Steve O'Neil, PADEP
Mr. Ayman Ghobrial, PADEP
Re

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
February 26, 2008

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

RECEIVED
FEB 29 2008
By

Mr. Scott A. Baker, P.E.
Sunoco, Inc.
3144 Passyunk Avenue
Philadelphia, PA 19145

Re: Storage Tank Program
Facility ID No. 51-36558 & 51-19781
Sunoco Girard Point & Point Breeze Facilities
3144 Passyunk Avenue
Philadelphia County

Dear Mr. Baker:

Over the past few years, we have received documents from you that mention how Sunoco considers certain regulated storage tank release incidents to be covered by the 2003 Consent Order & Agreement (CO&A) between the Department and Sunoco, Inc. The purpose of this letter is to clarify for you which release incidents at the two above-mentioned facilities are covered under the 2003 CO&A. Paragraph 8 of the CO&A states that release incidents associated with a closure or change-in-service of an aboveground storage tank (AST) are covered by the CO&A. Thus, incidents not involving a tank closure or change-in-service are not covered.

All incidents occurring at these two facilities in the past few years (since we have been actively tracking regulated storage tank releases) are listed in the two tables below. There are multiple incidents that have occurred at these two facilities prior to our tracking of releases, which are not listed in the tables below and were not adequately addressed. Please be sure to address those releases incidents as well in accordance with either the CO&A or the corrective action process detailed in the storage tank regulations (25 Pa. Code Chapter 245 Subchapter D).

Please note that the CO&A does state that corrective actions required by Chapter 245 Sections 304, 305, 306, and 307 must still be completed for any AST closure and change-in-service.

Release incidents covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	1002	139A	4-7-06
Girard Point	1100	140A	5-31-06
Girard Point	277	039A	6-25-07
Girard Point	1208	025A	6-28-07
Point Breeze	119	024A	4-7-06
Point Breeze	182	048A	5-31-06
Point Breeze	181	047A	6-22-07
Point Breeze	848	116A	6-25-07
Point Breeze	252	055A	6-28-07

Release incidents NOT covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	250	030A	1-27-07
Girard Point	T-201	175A	12-10-07
Girard Point	1088	089A	12-31-07
Point Breeze	881	120A	9-3-05
Point Breeze	140	031A	9-15-05
Point Breeze	847	115A	9-3-06
Point Breeze	885	124A	10-15-06

The Department realizes that several corrective action reports have been submitted for some of the above-listed incidents which are not covered by the CO&A. We will issue a response for those reports. All incidents covered by the CO&A will be "administratively closed out" on our eFACTS database with a comment stating that the release will be addressed under the CO&A.

This letter is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

Sincerely,

Heidi J. Kunsch
Water Quality Specialist
Environmental Cleanup

cc: Philadelphia Health Department
Mr. Higgins, Philadelphia L&I
Mr. Stan Sneath, PADEP
Mr. Steve O'Neil, PADEP
Mr. Ayman Ghobrial, PADEP
Re

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
March 7, 2005

RECEIVED
MAR 14 2005
By

Southeast Regional Office

484-250-5900
Fax 484-250-5761

Mr. Pat Chabeda
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Re: ECP - Tanks Program
Sunoco Point Breeze
Tank #826 (PA 100A) Spill
Facility ID # 51-19781
e-FACTS Site # 242498
City of Philadelphia

Dear Mr. Chabeda :

The Pennsylvania Department of Environmental Protection (DEP), has received and reviewed the Site Assessment Report dated January 5, 2005, for the site referenced above. SECOR International, Inc. (SECOR), consultant for Sunoco, submitted this document to the DEP on January 6, 2005. This investigation was initiated following the release of approximately 48 gallons of Crude Oil into the dike surrounding the tank on July 13, 2004. Notification of Release documentation was provided to DEP on July 26, 2004. The rainwater/crude oil mixture was contained within the tank #826 berm.

On September 7, 2004 SECOR collected nine soil samples approximately 6 inches below the surface throughout the zone of impact within the tank dike. Analytical results from the samples showed no exceedences of the Act 2 Non-Residential Soil to Groundwater Standards.

With the submission of this report, DEP believes that the Act 2 and §245 requirements for a Release investigation (§245.304), Site Characterization (§245.309), and Remedial Action Completion Report (§245.313) have been met for this release. Soils at this site have been demonstrated to be in compliance with the Act 2 Non-Residential Statewide Health Standards.

If you have any questions or need further information regarding this matter, please contact the Environmental Cleanup Program.

Sincerely,

Walter J. Payne, P.G.
Licensed Professional Geologist
Environmental Cleanup Program
DEP Southeast Regional Office

cc: Mr. Sinding
Mr. Horvat, P.G.
Mr. Day-Lewis, P.G.
Ms. Nagle
Mr. Brown
Mr. Sneath, Esq.
Mr. Burke
Mr. Young, P.G.
Ms. Warren
Mr. Oppenheim (Sunoco)
Mr. Moreschalchi, P.G. (SECOR)
Mr. Baggett, P.G. (SECOR)
City of Philadelphia
Regional File

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
October 13, 2004

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

OCT 15 2004
By

Mr. Pat Chabeda
Sunoco, Inc
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145

Re: Storage Tank Program
Sunoco Inc Point Breeze
Facility ID No. 51-19781
3144 Passyunk Avenue
City of Philadelphia
Philadelphia County

Dear Mr. Chabeda:

On October 7, 2004 we received your report entitled "Remedial Action Completion Report", dated October 6, for the storage tank facility referenced above. We consider this submittal to be the Remedial Action Completion Report required by the Corrective Action Process regulations, 25 Pa. Code Section 245.313.

You have identified your selected cleanup standard as the Department's Site Specific Standard. As such, the Department will attempt to review this report within 90 days of its receipt and send a review letter to the facility owner.

If you have any questions concerning the requirements of the Corrective Action Process regulations, please contact me at (484) 250-5916.

Sincerely,

Stephan B. Sinding
Chief, Storage Tank Section
Environmental Cleanup

cc: Philadelphia County Health Department
City of Philadelphia
Mr. Morescalchi
Mr. Payne
Re 30 (CB04ECP) 287-3

PB 885

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
October 17, 2006

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

NOTICE OF VIOLATION

Mr. Ron Rosendorn
Sunoco, Inc. R&M
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

RECEIVED
OCT 19 2006
By RR

Re: Storage Tank Program
Facility ID No. 51-19781
Point Breeze Process Area
City of Philadelphia
Philadelphia County

Dear Mr. Rosendorn:

On October 15, 2006, a reportable release of crude oil was confirmed at your above-named facility. This release constitutes a violation of Section 1310 of the Pennsylvania Storage Tank and Spill Prevention Act. Our purpose in sending you this notice is to advise you of your regulatory responsibility and to provide guidance and details to help you address this release quickly and effectively under the Department's corrective action regulations (Title 25, Chapter 245, subchapter D).

In order to ensure the release is addressed in a prompt and appropriate manner, you should provide a progress report to this office no later than January 13, 2007. A copy is enclosed for your use. Your site characterization report is due April 13, 2007. No extension of the site characterization report due date will be provided without prior written approval from the Department. All requests for deadline extensions shall be submitted via email or regular mail. The request should include a valid, technical reason for the extension as well as a revised SCR submittal date.

Please note that we intend to initiate a compliance action if you fail to comply with the regulations. We encourage you to proceed without delay to hire a qualified environmental consulting firm that has a Registered Professional Geologist on staff that can assist you in accomplishing the requirements outlined below.

1. INTERIM REMEDIAL ACTIONS

Effective interim actions may resolve a problem or reduce the severity of a problem making site cleanup easier and less expensive. Some typical interim actions are listed on the attached *90 Day Site Characterization Status Report* form.

If your release does affect or diminish a private or public water supply, you must provide a temporary water supply for affected users within 48 hours. Within 90 days, a permanent water supply must be in place. Treatment to remove or prevent contamination of a public water supply may require a permit from the Department. We recommend that you contact the regional Water Supply Management Program (WSM) at 484-250-5980 prior to any planned treatment installations on a public source. If you are unsure if a well is classified as a public water source, WSM can advise you.

The regulations require that within 15 days of the release you provide written notification of the release to the municipality where the release occurred and to each municipality that has been impacted. We recommend that you establish an open dialogue to insure the appropriate municipal officials remain informed of site activities.

2. CORRECTIVE ACTION ACTIVITIES AND REPORTS

After a release has been confirmed, other corrective actions are required in addition to the interim remedial actions listed on the *90 Day Site Characterization Status Report* form. Some of these requirements include fieldwork and report submission under the site characterization (which is required to identify your chosen cleanup standard), remedial action, and the remedial action completion report phases. In addition, the regulations specify time frames for conducting this work that must be followed.

If, in addition to your current release, you have had releases in the past, we request that these historic releases also be addressed in your current reports. If the past releases have been successfully remediated they should still be discussed in the narrative section of your site characterization report.

To discharge any treated groundwater you must have a General Permit (GP-5, Discharges from Petroleum Product Contaminated Groundwater Remediation Systems). Questions concerning General Permit approvals should be directed to our Water Management Program at 484-250-5970.

3. DOCUMENTS

Many of the documents mentioned in this letter can be found on the Department's website (www.depweb.state.pa.us) or by contacting our Regional Office at 484-250-5960.

Please feel free to contact Mr. Walter Payne by calling 484-250-5960 with any questions related to this letter. All reports referenced in this letter are to be submitted to:

Kathy Nagle, Storage Tank Section
PA DEP Southeast Region
2 E. Main Street
Norristown, PA 19401

This Notice of Violation is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

Sincerely,

Kathy J. Nagle
Chief, Storage Tank Section
Environmental Cleanup

Enclosure

cc: Philadelphia County Health Department
Mr. John Higgins, Philadelphia L & I
Mr. Kevin Gallagher
Mr. Walter Payne
Re 30

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
May 4, 2007

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

Mr. Ron Rosendorn
Sunoco, Inc. R&M
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

RECEIVED
MAY 0 8 2007
By RR

Re: Storage Tank Program
Sunoco, Inc. Point Breeze Process Area
Tank 885
Facility ID No. 51-19781
Point Breeze Process Area
City of Philadelphia
Philadelphia County

Dear Mr. Rosendorn:

On April 16, 2007 we received your report entitled "Site Characterization Report", dated April 12, 2007, for the storage tank facility referenced above. We consider this submittal to be the Remedial Action Completion Report required by the Corrective Action Process regulations, 25 Pa. Code Section 245.313.

You have identified your selected cleanup standard as either the Department's Statewide Health Standard or Background Standard. As such, the Department will attempt to review this report within 60 days of its receipt and send a review letter to the facility owner.

If you have any questions concerning the requirements of the Corrective Action Process regulations, please contact me at 484-250-5703.

Sincerely,

Thomas D. Canigiani, Jr.
Water Quality Specialist Supervisor
Environmental Cleanup

cc: Philadelphia County Health Department
City of Philadelphia
Mr. Miceli, USTIF
Mr. Baker (Sunoco Env. Department)
Mr. Payne
Re 30 (RW07ECP) 124-2

PB 826

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
March 7, 2005

RECEIVED
MAR 14 2005
By

Southeast Regional Office

484-250-5900
Fax 484-250-5761

Mr. Pat Chabeda
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Re: ECP - Tanks Program
Sunoco Point Breeze
Tank #826 (PA 100A) Spill
Facility ID # 51-19781
e-FACTS Site # 242498
City of Philadelphia

Dear Mr. Chabeda :

The Pennsylvania Department of Environmental Protection (DEP), has received and reviewed the Site Assessment Report dated January 5, 2005, for the site referenced above. SECOR International, Inc. (SECOR), consultant for Sunoco, submitted this document to the DEP on January 6, 2005. This investigation was initiated following the release of approximately 48 gallons of Crude Oil into the dike surrounding the tank on July 13, 2004. Notification of Release documentation was provided to DEP on July 26, 2004. The rainwater/crude oil mixture was contained within the tank #826 berm.

On September 7, 2004 SECOR collected nine soil samples approximately 6 inches below the surface throughout the zone of impact within the tank dike. Analytical results from the samples showed no exceedences of the Act 2 Non-Residential Soil to Groundwater Standards.

With the submission of this report, DEP believes that the Act 2 and §245 requirements for a Release investigation (§245.304), Site Characterization (§245.309), and Remedial Action Completion Report (§245.313) have been met for this release. Soils at this site have been demonstrated to be in compliance with the Act 2 Non-Residential Statewide Health Standards.

If you have any questions or need further information regarding this matter, please contact the Environmental Cleanup Program.

Sincerely,

Walter J. Payne, P.G.
Licensed Professional Geologist
Environmental Cleanup Program
DEP Southeast Regional Office

cc: Mr. Sinding
Mr. Horvat, P.G.
Mr. Day-Lewis, P.G.
Ms. Nagle
Mr. Brown
Mr. Sneath, Esq.
Mr. Burke
Mr. Young, P.G.
Ms. Warren
Mr. Oppenheim (Sunoco)
Mr. Moreschalchi, P.G. (SECOR)
Mr. Baggett, P.G. (SECOR)
City of Philadelphia
Regional File

Sent By Telefax 07/26/2004

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

Certified Mail Return Receipt: 7002 0460 0003 1935 0310

July 26, 2004

RECEIVED
JUL 2 8 2004
By

Mr. Stephan Sinding
PaDEP – S.E. Regional Office
2 East Main Street
Norristown, PA 19401

Storage Tanks PB-826 (PA Registration #100A)
Sunoco, Inc. (R&M) – Point Breeze Process Area
Facility ID #51-19781

Dear Mr. Sinding:

This letter complies with PA Tank Regulations 245.305 reporting releases. On Tuesday, July 21, 2004, PaDEP was notified of a release from the roof drain valve into the emergency containment area of 826 tank. The tank's current status is Active.

On 7/13/04 a Sunoco employee was draining the roof of 826tk after heavy rains. Oil was discharged with the rain water. Clean up was immediately initiated using vacuum trucks. Initial inspection of the roof has indicated that the heavy rain slightly cantered the roof forcing a small amount of oil onto it through the roof legs in the SE quadrant of the roof and then out of the roof drain.

A site characterization is to be performed on the site and a report completed within the required time frame.

Should you have any questions or comments in reference to this matter please contact me at 215 339-2074.

Very truly yours,

George A. Keegan
Supervisor Environmental Department

Attachment
GAK/pac

File: AST Releases – 2004

Cc: Philadelphia Local Emergency Planning Committee
SECOR International, Inc.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2530-FM-LRWM0082 Rev. 11/20(
BUREAU OF LAND RECYCLING AND WASTE MANAGEMEN

NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

☒ Initial
☐ Follow-Up

NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

The Storage Tank Program's Corrective Action Process (CAP) regulations establish release reporting requirements for owners and operators of storage tanks and storage tank facilities.

Subsection 245.305(a) of the regulations requires owners or operators to notify the appropriate regional office of the Department as soon as practicable, but no later than 24 hours, after the confirmation of a reportable release.

Subsection 245.305(d) requires owners or operators to provide an initial written notification to the Department, each municipality in which the reportable release occurred, and each municipality where that release has impacted environmental media or water supplies, buildings, or sewer or other utility lines, within 15 days of the notice required by Subsection 245.305(a).

Subsection 245.305(e) requires owners or operators to provide follow-up written notification to the Department and to each impacted municipality of new impacts to environmental media or water supplies, buildings, or sewer or other utility lines discovered after the initial written notification required by subsection 245.305(d). Written notification is to be made within 15 days of the discovery of the new impact.

This form may be used to comply with Subsection 245.305(d) and (e).

OWNERS AND OPERATORS (O/O)
INDICATE IF THIS IS AN INITIAL OR FOLLOW-UP NOTIFICATION BY MARKING THE APPROPRIATE BOX FOUND IN THE TOP RIGHT-HAND CORNER OF THIS FORM. PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIB, IV, V, VII and VIII.

NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

The Storage Tank Program's Certification regulations establish standards of performance for certified installers and inspectors of storage tanks and storage tank facilities.

Subsection 245.132(a)(4) of the regulations requires certified installers and inspectors to report to the Department a release of a regulated substance or confirmed or suspected contamination of soil, surface or groundwater from regulated substances observed while performing services as a certified installer or inspector.

This form may be used to comply with Subsection 245.132(a)(4). Subsection 245.132(a)(4) requires submission of the form within 48 hours of observing suspected or confirmed contamination. Where there is a reportable release, the form may be submitted jointly by the owner, operator, certified installer and certified inspector. In this instance, the form must be received by the appropriate regional office within 15 days of the notice required by Subsection 245.305(a).

CERTIFIED INSTALLERS AND INSPECTORS (I/I)
PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIC, VI, VII and VIII.

INSTRUCTIONS

I. **FACILITY INFORMATION** - Record the name, I.D. number and physical location (not P.O. Box) of the facility at which a reportable release has been confirmed or at which suspected or confirmed contamination has been observed. Include the name and phone number of a person to contact at the facility.

II. **OWNER/OPERATOR INFORMATION** - Record the name, business address and phone number of the owner of the facility identified in Section I. Also, record the name and phone number of the operator of the facility.

III. **REGULATED SUBSTANCE INFORMATION** - Indicate to the best of your knowledge: A) the type of product or products involved; B) the quantity of product or products released; and C) whether the contamination is suspected or confirmed.

IV. **REPORTABLE RELEASE INFORMATION** - Record the date of confirmation of the reportable release, e.g., "9/18/01"; the date and regional office notified; and the date the local municipality(ies) [provide name of municipality(ies)] was/were sent a copy of this form. Indicate to the best of your knowledge the source/cause of the release, how the release was discovered and the environmental media affected and impacts.

V. **INTERIM REMEDIALACTIONS** - Indicate the interim remedial actions planned, initiated or completed.

VI. **SUSPECTED/CONFIRMED CONTAMINATION INFORMATION** - Record the date of observation of the suspected or confirmed contamination, e.g., "11/24/01". Indicate to the best of your knowledge the indications of a suspected release or extent of confirmed contamination resulting from the release of the regulated substance.

VII. **ADDITIONAL INFORMATION** - Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include in this section specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Use additional 8½" x 11" sheets of paper, if necessary.

VIII. **CERTIFICATION** - Please print your name, and provide your signature and date of signature. If a certified installer/inspector, provide certification number and company certification number.

IX. **ATTACHMENT** - If a certified installer/inspector, provide a copy of failed valid tightness test(s), if applicable.

PLEASE SEND COMPLETED ORIGINAL FORM TO:
PA Department of Environmental Protection
Environmental Cleanup Program
Storage Tank Section
(and the appropriate address below,
depending on where the FACILITY is located)

IF A REPORTABLE RELEASE, ALSO SEND A COPY OF THE FORM TO:
PA Department of Environmental Protection
Land Recycling and Cleanup Program
Attn: Storage Tank Corrective Action
P.O. Box 8471
Harrisburg, PA 17105-8471 FAX: 717-787-0884

Southeast Region	Northeast Region	Southcentral Region	Northcentral Region	Southwest Region	Northwest Region
Lee Park, Suite 6010 555 North Lane Conshohocken, PA 19428 PHONE: 610-832-5950/6000 FAX: 610-832-6143	2 Public Square Wilkes-Barre, PA 18711-0790 PHONE: 570-826-2511 FAX: 570-820-4907	909 Elmerton Avenue Harrisburg, PA 17110 PHONE: 877-333-1904 FAX: 717-705-4830	208 W. Third Street, Suite 101 Williamsport, PA 17701 PHONE: 570-321-6525/327-3696 FAX: 570-327-3420	400 Waterfront Drive Pittsburgh, PA 15222 PHONE: 412-442-4091/4000 FAX: 412-442-4328	230 Chestnut Street Meadville, PA 16335-3481 PHONE: 814-332-6945 800-373-3398 FAX: 814-332-6121
Counties Bucks, Chester, Delaware, Montgomery, Philadelphia	**Counties** Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming	**Counties** Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York	**Counties** Bradford, Cameron, Centre, Clinton, Clearfield, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union	**Counties** Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland	**Counties** Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, Warren

2530-FM-LRWM0082 Rev. 11/2001

FACILITY I.D. NUMBER 51 - 19781

I. FACILITY INFORMATION (Both O/O and I/I)

Facility Name: Sunoco, Inc. - Point Breeze Process Area
Facility I.D. Number: 51-19781
Street Address (P.O. Box not acceptable): 3144 Passyunk Ave.
City: Philadelphia
State: PA
Zip Code: 19145-5299
County: Philadelphia
Municipality: Philadelphia
Contact Person: Patrick Chabeda
Phone Number: (215) 339 - 2528

II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)

Owner Name: Sunoco Inc.
Address: 3144 Passyunk Ave
City: Philadelphia
State: PA
Zip Code: 19145 - 5299
Phone Number: (215) 339 - 2528
Operator Name: Patrick Chabeda
Phone Number: (215) 339 - 2528

III. REGULATED SUBSTANCE INFORMATION

A. Type of Product(s) Involved (Mark All That Apply ☒): Both O/O and I/I		B. Quantity (Gallons) of Product(s) Released: O/O Only	C. Contamination Suspected [S] or Confirmed [C] (Mark All That Apply ☒): I/I Only
Leaded Gasoline	☐		[S] [C]
Unleaded Gasoline	☐		[S] [C]
Aviation Gasoline	☐		[S] [C]
Kerosene	☐		[S] [C]
Jet Fuel	☐		[S] [C]
Diesel Fuel	☐		[S] [C]
New Motor Oil	☐		[S] [C]
Used Motor Oil	☐		[S] [C]
Fuel Oil No. 1	☐		[S] [C]
Fuel Oil No. 2	☐		[S] [C]
Fuel Oil No. 4	☐		[S] [C]
Fuel Oil No. 5	☐		[S] [C]
Fuel Oil No. 6	☐		[S] [C]
Other (Specify) crude oil	☒	4 8	[S] c [C]
Unknown	☐		[S] [C]

IV. REPORTABLE RELEASE INFORMATION (O/O Only)

Date Reportable Release was Confirmed: 07 (m) / 13 (d) / 2004 (y)

Date Owner/Operator Verbally Notified Appropriate Regional Office of Reportable Release and Office Notified:
Date: 07 (m) / 13 (d) / 2004 (y) Office S.E. Region

Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified:
Date: 07 (m) / 21 (d) / 2004 (y) Municipality Philadelphia
Date: ___ (m) / ___ (d) / ___ (y) Municipality ___

Source/Cause (Mark All That Apply ☒):		How Discovered (Mark All That Apply ☒):		Environmental Media Affected and Impacts (Mark All That Apply ☒):	
Tank (DEP Assigned Nos. 100A)	☒	During Closure	☐	Soil	☒
Piping System (Aboveground Regulated)	☐	Lining Installation	☐	Sediment	☐
Piping System (Underground Regulated)	☐	Routine Leak Detection	☐	Surface Water	☐
Piping System (Non-Regulated)	☐	Third Party Inspection	☐	Ground Water	☐
Dispenser/Dispensing Equipment	☐	Tightness Testing Activities	☐	Bedrock	☐
Spill Catchment Basin	☐	Visible Product or Odor Reports	☒	Water Supplies	☐
Accident/Act of God	☐	Water in Tank	☐	Vapors/Product in Buildings	☐
Containment/Sump Failure	☐	Construction	☐	Vapors/Product in Sewer/Utility Lines	☐
Faulty Installation	☐	Upgrade/Repair	☐	Ecological Receptors	☐
Corrosion	☐	Supply Well Sample Results	☐		
Mechanical Failure	☐	Monitoring Well Sample Results	☐		
Spill During Delivery	☐	Property Transfer	☐		
Overfill at Delivery	☐	Other (Specify) ___	☐		
Vehicle Gas Tank Overfill	☐	Unknown	☐		
Product Delivery Hose Rupture	☐				
Other (Specify) Roof Drain	☒				
Unknown	☐				

V. INTERIM REMEDIAL ACTIONS (O/O Only)

(Mark All That Apply ☒):

	Planned	Initiated	Completed	Not Applicable
Regulated Substance Removed from Storage Tanks	☐	☐	☐	☒
Fire, Explosion and Safety Hazards Mitigated	☐	☐	☒	☐
Contaminated Soil Excavated	☐	☐	☐	☐
Free Product Recovered	☒	☐	☐	☐
Water Supplies Identified and Sampled	☐	☐	☒	☒
Temporary Water Supplies Provided	☐	☐	☐	☒
Other (Specify)	☐	☐	☐	☒

VI. SUSPECTED / CONFIRMED CONTAMINATION INFORMATION (I/I Only)

Date of Observation of Suspected/Confirmed Contamination: 07 (m) / 13 (d) / 2004 (y)

Indication of Suspected Contamination (Mark All That Apply ☒):

- Unusual Level of Vapors ☐
- Erratic Behavior of Product Dispensing Equipment ☐
- Release Detection Results Indicate a Release ☐
- Discovery of Holes in the Storage Tank ☐
- Other (Specify) _____ ☐

Extent of Confirmed Contamination (Mark All That Apply ☒):

- Product Stained or Product Saturated Soil or Backfill ☐
- Ponded Product ☐
- Free Product or Sheen on Ponded Water ☐
- Free Product or Sheen on the Ground Water Surface ☐
- Free Product or Sheen on Surface Water ☐
- Other (Specify) _____ ☐

VII. ADDITIONAL INFORMATION (Both O/O and I/I)

Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Provide DEP assigned and owner/operator assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

SUNOCO TANK # PB-826

PA DEP # 100A

Please see attached letter.

FACILITY I.D. NUMBER 51 - 19781

VIII. CERTIFICATION (Both O/O and I/I)

I, Patrick A. Chabeda, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Owner or Operator

07 / 21 / 2004
Date

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

/ /
Date

Installer Certification Number

Company Certification Number

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Inspector

/ /
Date

Inspector Certification Number

Company Certification Number

SECOR International Incorporated
Philadelphia Office
102 Pickering Way, Suite 200
Exton, Pennsylvania 19341
Phone: (484) 875-3075
FAX: (484) 875-9286

LETTER OF TRANSMITTAL

Attn: **Stephan Sinding** **Date: 01-05-05**

Company: **Pennsylvania Department of Environmental Protection**

Address: **2 East Main Street**
Norristown, Pennsylvania 19401

Project: **SUNOCO Philadelphia Refinery, Facility ID #51-19781**

RE: **Site Assessment Report, AST PB-826 (PA Registration #100A)**

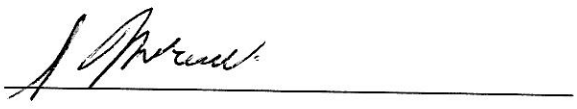
ENCLOSED:
( ) **Proposal**
( ) **Contract**
(X) **Report**
( ) **Letter Report**
( ) **Other:**

FOR:
( ) **As Requested**
( ) **Review**
(X) **Your Information**
( ) **Approval**
( ) **Signature**
( ) **Return**
( ) **Other:**

Comments:

Attached is the Site Assessment Report for AST 826 located at the SUNOCO Philadelphia Refinery in Philadelphia, Pennsylvania. Please feel free to call me with any questions or comments.

Signature: Sergio Morescalchi
Title: Project Geologist



SECOR International Incorporated
Philadelphia Office
102 Pickering Way, Suite 200
Exton, Pennsylvania 19341
Phone: (484) 875-3075
FAX: (484) 875-9286

LETTER OF TRANSMITTAL

Attn: **Pat Chabeda** **Date: 01-05-05**

Company: **Sunoco, Inc.**

Address: **3144 Passyunk Avenue**
Philadelphia, Pennsylvania 19145

Project: **SUNOCO Philadelphia Refinery, Facility ID #51-19781**

RE: **Site Assessment Report, AST PB-826 (PA Registration #100A)**

ENCLOSED:
( ) **Proposal**
( ) **Contract**
(X) **Report**
( ) **Letter Report**
( ) **Other:**

FOR:
( ) **As Requested**
( ) **Review**
(X) **Your Information**
( ) **Approval**
( ) **Signature**
( ) **Return**
( ) **Other:**

Comments:

Attached is a copy of the Site Assessment Report. As per your request, the original report was forwarded to Mr. Stephan Sinding at the PADEP. Please call with any questions.

Signature: Sergio Morescalchi
Title: Project Geologist

SECOR

SECOR
INTERNATIONAL
INCORPORATED

www.secor.com

January 5, 2005

Mr. Pat Chabeda
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Storage Tank PB-826 (PA Registration #100A) Site Assessment Report**
Sunoco, Inc. (R&M) – Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID #51-19781

Dear Mr. Chabeda:

This letter summarizes the site assessment activities that were conducted in the vicinity of aboveground storage tank (AST) PB-826 at the Sunoco, Inc. (Sunoco) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Site assessment activities consisted of confirmation surface soil sampling after remedial activities were completed.

On July 13, 2004, a SUNOCO employee was draining the roof of AST 826 after heavy rains. The heavy rains had slightly tilted the roof, forcing a small amount (approximately 48 gallons) of crude oil onto the roof. When the SUNOCO employee drained the roof of the rain water, the crude oil was discharged with it and into the tank berm. Clean up was immediately initiated using vacuum trucks. Sunoco notified the Pennsylvania Department of Environmental Protection (PADEP) of the release and subsequent remedial activities in a letter dated July 26, 2004. The approximate extent of the release is depicted on **Figure 2**. As indicated on **Figure 2** and noted above, the rain water/crude oil mixture that was released was confined within the tank berm.

Soil Sampling Activities

On September 7, 2004, a SECOR International Incorporated (SECOR) Professional Geologist certified in Pennsylvania collected 9 soil samples in order to verify that remedial activities were successful. Soil samples designated 826-1 through 826-9 were collected within the release area at a depth of approximately 6 inches below ground surface. Soil sampling locations are depicted on **Figure 2**. Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (except total lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, isopropylbenzene and naphthalene by EPA Method 5035/8021B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno (1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8310.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Nonresidential Used Aquifer Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

Soil samples 826-1 through 826-9 did not exceed any Nonresidential Surface Soil and Subsurface Soil Direct Contact MSC or Nonresidential Used Aquifer Soil-to-Groundwater MSC.

Conclusions

Nine soil samples were collected in order to verify that remedial activities in the area of AST PB-826 were successful. Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

Sincerely,
SECOR International Incorporated

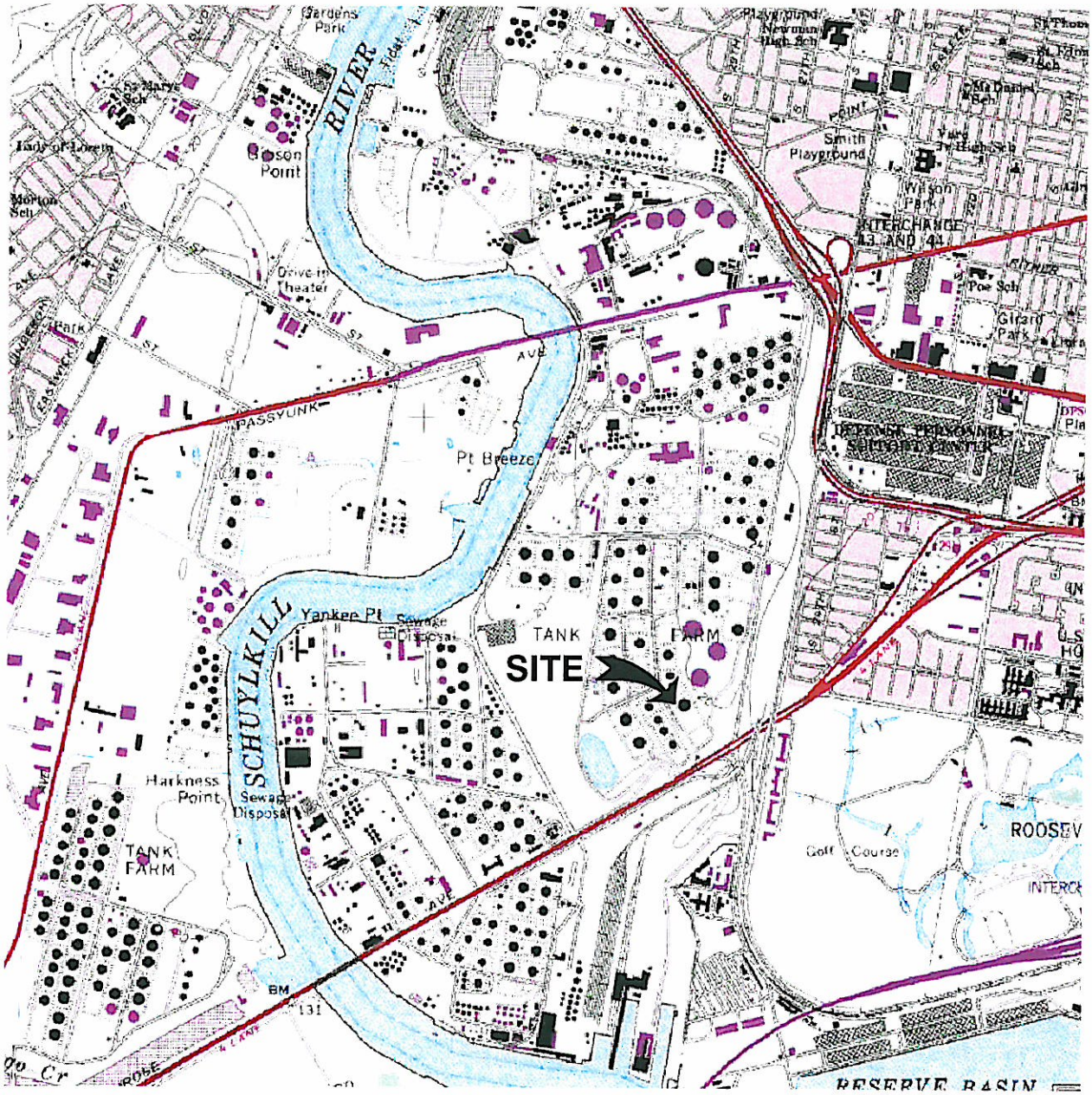
Sergio Morescalchi, P.G.
Project Geologist

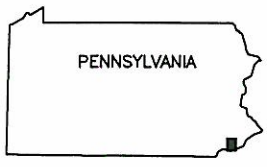
Steve Baggett, P.G.
Principal Hydrogeologist

c: James Oppenheim (Sunoco)
Project File

P:\Clients\Sunoco\AST Investigations\AST 826\AST 826 SAR.doc

FIGURES





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

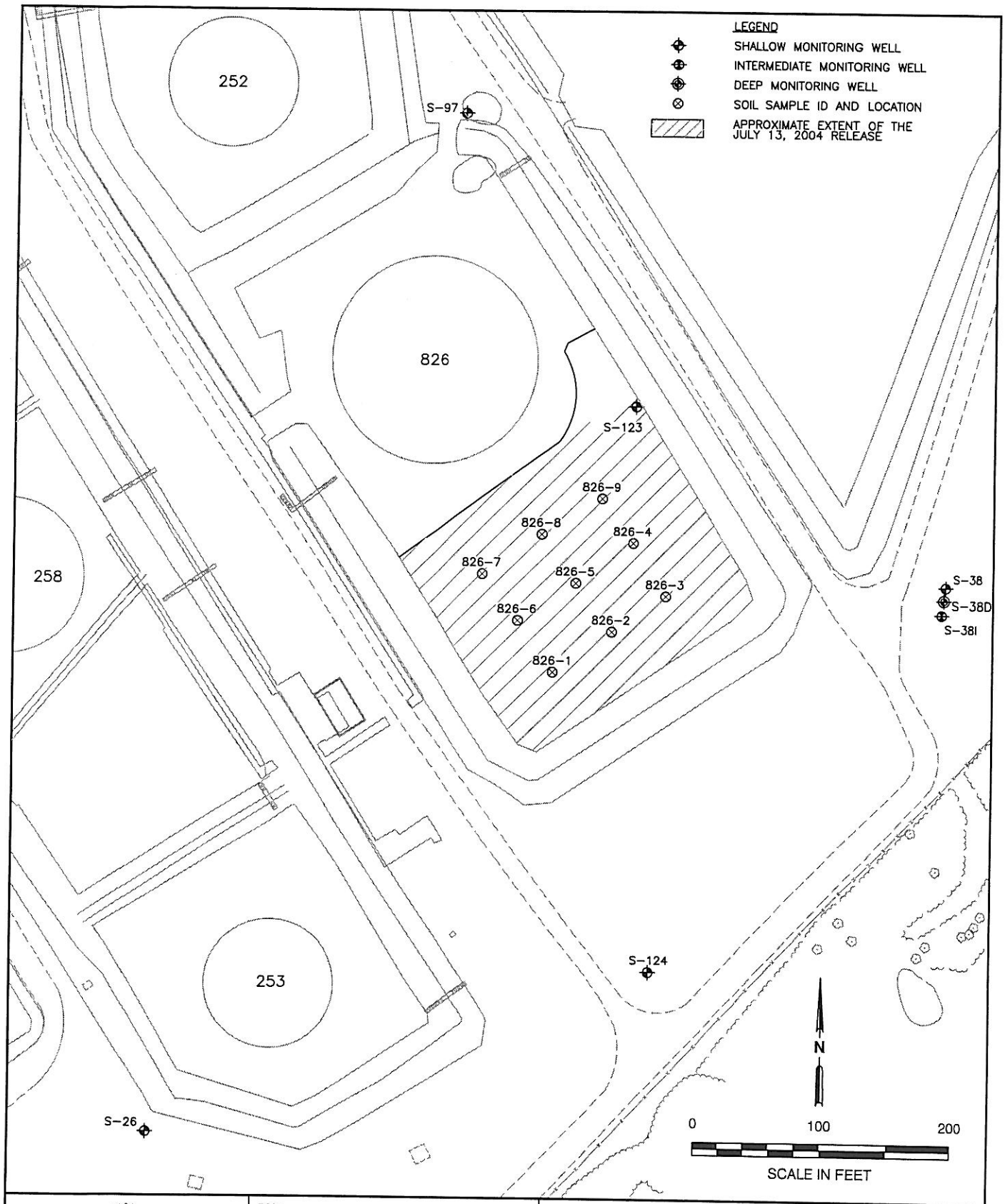
FOR: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

SITE LOCATION MAP
AST 826 AREA

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01062.04	KEF			11/09/2004

62SU-1062-SL.DWG



SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

SOIL SAMPLE LOCATIONS
AST 826 AREA

FIGURE: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01062.04	KEF			11/30/2004

62SU-1062-SSL.DWG

TABLES

TABLE 1
Summary of Soil Analytical Results

AST 826
Sunoco Philadelphia Refinery

Sample Identification	826-1	826-2	826-3	826-4	MSCs		
Sample Collection Date	9/7/2004	9/7/2004	9/7/2004	9/7/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	ND (1.9)	ND (2.0)	ND (1.9)	ND (2.0)	210,000	240,000	500
Toluene	2.7 J	5.4	4.3 J	ND (2.0)	10,000,000	10,000,000	100,000
Ethylbenzene	ND (1.9)	2.5 J	2.2 J	ND (2.0)	10,000,000	10,000,000	70,000
Isopropylbenzene	ND (4.7)	ND (4.9)	ND (4.8)	ND (5.0)	10,000,000	10,000,000	1,600,000
Naphthalene	ND (9.5)	16 J	15 J	ND (10)	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	68	230	23 J	16	190,000,000	190,000,000	350,000
Benzo(a)anthracene	240	880	110	83	110,000	190,000,000	320,000
Benzo(a)pyrene	250	800	160	100	11,000	190,000,000	46,000
Benzo(b)fluoranthene	210	710	130	86	110,000	190,000,000	170,000
Benzo(ghi)perylene	420	1,000	280	170	170,000,000	190,000,000	180,000
Chrysene	230	820	130	89	11,000,000	190,000,000	230,000
Fluorene	33 J	110 J	ND (23)	12 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	97	500	71 J	46	110,000	190,000,000	28,000,000
Phenanthrene	390	1,500	150	120	190,000,000	190,000,000	10,000,000
Pyrene	780	2,400	440	250	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (1.9) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 1
Summary of Soil Analytical Results

AST 826
Sunoco Philadelphia Refinery

Sample Identification	826-5	826-6	826-7	826-8	MSCs		
Sample Collection Date	9/7/2004	9/7/2004	9/7/2004	9/7/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	ND (1.9)	ND (2.1)	ND (2.1)	ND (2.1)	210,000	240,000	500
Toluene	2.7 J	ND (2.1)	ND (2.1)	8.1	10,000,000	10,000,000	100,000
Ethylbenzene	ND (1.9)	ND (2.1)	ND (2.1)	4.8 J	10,000,000	10,000,000	70,000
Isopropylbenzene	ND (4.9)	ND (5.2)	ND (5.2)	ND (5.2)	10,000,000	10,000,000	1,600,000
Naphthalene	ND (9.7)	ND (10)	ND (10)	ND (10)	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	5.6 J	0.85 J	ND (0.71)	23 J	190,000,000	190,000,000	350,000
Benzo(a)anthracene	27	5.6 J	4.1 J	110	110,000	190,000,000	320,000
Benzo(a)pyrene	32	8.5 J	6.1 J	110	11,000	190,000,000	46,000
Benzo(b)fluoranthene	27	6.9 J	4.8 J	110	110,000	190,000,000	170,000
Benzo(ghi)perylene	52	13 J	11 J	170	170,000,000	190,000,000	180,000
Chrysene	28	6.4 J	5.3 J	98	11,000,000	190,000,000	230,000
Fluorene	ND (4.6)	ND (4.7)	ND (4.7)	ND (23)	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	24	4.0 J	ND (3.9)	60 J	110,000	190,000,000	28,000,000
Phenanthrene	31	5.9 J	5.1 J	130	190,000,000	190,000,000	10,000,000
Pyrene	76	17 J	14 J	280	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (1.9) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 1
Summary of Soil Analytical Results

AST 826
Sunoco Philadelphia Refinery

Sample Identification	826-9	MSCs		
Sample Collection Date	9/7/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs				
Benzene	ND (2.0)	210,000	240,000	500
Toluene	3.6 J	10,000,000	10,000,000	100,000
Ethylbenzene	ND (2.0)	10,000,000	10,000,000	70,000
Isopropylbenzene	ND (5.0)	10,000,000	10,000,000	1,600,000
Naphthalene	ND (9.9)	56,000,000	190,000,000	25,000
SVOCs				
Anthracene	25	190,000,000	190,000,000	350,000
Benzo(a)anthracene	48	110,000	190,000,000	320,000
Benzo(a)pyrene	47	11,000	190,000,000	46,000
Benzo(b)fluoranthene	47	110,000	190,000,000	170,000
Benzo(ghi)perylene	68	170,000,000	190,000,000	180,000
Chrysene	74	11,000,000	190,000,000	230,000
Fluorene	21 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	20	110,000	190,000,000	28,000,000
Phenanthrene	180	190,000,000	190,000,000	10,000,000
Pyrene	170	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (1.9) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

APPENDIX A

Laboratory Analytical Report
September 7, 2004 Soil 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:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 911205. Samples arrived at the laboratory on Wednesday, September 08, 2004. The PO# for this group is AST 826 - PHILA. REF.

Client Description	Lancaster Labs Number
826-1 Grab Soil Sample	4347770
826-2 Grab Soil Sample	4347771
826-3 Grab Soil Sample	4347772
826-4 Grab Soil Sample	4347773
826-5 Grab Soil Sample	4347774
826-6 Grab Soil Sample	4347775
826-7 Grab Soil Sample	4347776
826-8 Grab Soil Sample	4347777
826-9 Grab Soil Sample	4347778
Trip Blank Methanol Sample	4347779

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Victoria M. Martell
Chemist

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. SW 4347770

826-1 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 12:30 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

826-1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		1.9	ug/kg	21
08184	Toluene	108-88-3	2.7	J	1.9	ug/kg	21
08185	Ethylbenzene	100-41-4	N.D.		1.9	ug/kg	21
08188	Isopropylbenzene	98-82-8	N.D.		4.7	ug/kg	21
08189	Naphthalene	91-20-3	N.D.		9.5	ug/kg	21
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	33.	J	23.	ug/kg	5
01007	Phenanthrene	85-01-8	390.		11.	ug/kg	5
01008	Anthracene	120-12-7	68.		3.4	ug/kg	5
01012	Pyrene	129-00-0	780.		26.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	240.		7.5	ug/kg	5
01016	Chrysene	218-01-9	230.		11.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	210.		15.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	250.		11.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	97.		19.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	420.		15.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347770

826-1 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 12:30 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

826-1

00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 17:55	Stephanie A Selis	21
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 10:55	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:22	Nadine Fegley	n.a.

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347771

826-2 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 12:50 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

826-2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.0	ug/kg	21
08184	Toluene	108-88-3	5.4		2.0	ug/kg	21
08185	Ethylbenzene	100-41-4	2.5	J	2.0	ug/kg	21
08188	Isopropylbenzene	98-82-8	N.D.		4.9	ug/kg	21
08189	Naphthalene	91-20-3	16.	J	9.8	ug/kg	21
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	110.	J	23.	ug/kg	5
01007	Phenanthrene	85-01-8	1,500.		12.	ug/kg	5
01008	Anthracene	120-12-7	230.		3.5	ug/kg	5
01012	Pyrene	129-00-0	2,400.		27.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	880.		31.	ug/kg	20
01016	Chrysene	218-01-9	820.		12.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	710.		62.	ug/kg	20
01019	Benzo(a)pyrene	50-32-8	800.		46.	ug/kg	20
01025	Indeno(1,2,3-cd)pyrene	193-39-5	500.		19.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	1,000.		15.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

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

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347771

826-2 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 12:50 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

826-2

00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 06:36	Stephanie A Selis	21
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 13:01	Mark A Clark	5
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/15/2004 08:01	Mark A Clark	20
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:24	Nadine Fegley	n.a.

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347772

826-3 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 13:20 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

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826-3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	12.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		1.9	ug/kg	21
08184	Toluene	108-88-3	4.3	J	1.9	ug/kg	21
08185	Ethylbenzene	100-41-4	2.2	J	1.9	ug/kg	21
08188	Isopropylbenzene	98-82-8	N.D.		4.8	ug/kg	21
08189	Naphthalene	91-20-3	15.	J	9.6	ug/kg	21
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		23.	ug/kg	5
01007	Phenanthrene	85-01-8	150.		11.	ug/kg	5
01008	Anthracene	120-12-7	23.	J	3.4	ug/kg	5
01012	Pyrene	129-00-0	440.		27.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	110.		7.6	ug/kg	5
01016	Chrysene	218-01-9	130.		11.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	130.		15.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	160.		11.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	71.	J	19.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	280.		15.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

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

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Analysis Report

Lancaster Laboratories Sample No. SW 4347772

826-3 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 13:20 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

826-3

00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 18:33	Stephanie A Selis	21
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 13:43	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:25	Nadine Fegley	n.a.

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347773

826-4 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 13:40 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

826-4

Secor International, Inc.
102 Pickering Way
Suite 200
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CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.0	ug/kg	21
08184	Toluene	108-88-3	N.D.		2.0	ug/kg	21
08185	Ethylbenzene	100-41-4	N.D.		2.0	ug/kg	21
08188	Isopropylbenzene	98-82-8	N.D.		5.0	ug/kg	21
08189	Naphthalene	91-20-3	N.D.		10.	ug/kg	21
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	12.	J	4.8	ug/kg	1
01007	Phenanthrene	85-01-8	120.		2.4	ug/kg	1
01008	Anthracene	120-12-7	16.		0.72	ug/kg	1
01012	Pyrene	129-00-0	250.		5.6	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	83.		1.6	ug/kg	1
01016	Chrysene	218-01-9	89.		2.4	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	86.		3.2	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	100.		2.4	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	46.		4.0	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	170.		3.2	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/14/2004 18:56	Martha L Seidel	21
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 14:22	Mark A Clark	1
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:26	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347773

826-4 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 13:40 by SM

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

826-4

Account Number: 11183

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Analysis Report

Lancaster Laboratories Sample No. SW 4347774

826-5 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 13:50 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

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Exton PA 19341

826-5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		1.9	ug/kg	21
08184	Toluene	108-88-3	2.7	J	1.9	ug/kg	21
08185	Ethylbenzene	100-41-4	N.D.		1.9	ug/kg	21
08188	Isopropylbenzene	98-82-8	N.D.		4.9	ug/kg	21
08189	Naphthalene	91-20-3	N.D.		9.7	ug/kg	21
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		4.6	ug/kg	1
01007	Phenanthrene	85-01-8	31.		2.3	ug/kg	1
01008	Anthracene	120-12-7	5.6	J	0.69	ug/kg	1
01012	Pyrene	129-00-0	76.		5.4	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	27.		1.5	ug/kg	1
01016	Chrysene	218-01-9	28.		2.3	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	27.		3.1	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	32.		2.3	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	24.		3.9	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	52.		3.1	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 19:11	Stephanie A Selis	21
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 15:00	Mark A Clark	1
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:27	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347774

826-5 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 13:50 by SM

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 14:59
Discard: 10/24/2004

826-5

Account Number: 11183

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Analysis Report

Lancaster Laboratories Sample No. SW 4347775

826-6 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 14:00 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

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826-6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.1	ug/kg	22
08184	Toluene	108-88-3	N.D.		2.1	ug/kg	22
08185	Ethylbenzene	100-41-4	N.D.		2.1	ug/kg	22
08188	Isopropylbenzene	98-82-8	N.D.		5.2	ug/kg	22
08189	Naphthalene	91-20-3	N.D.		10.	ug/kg	22
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		4.7	ug/kg	1
01007	Phenanthrene	85-01-8	5.9	J	2.3	ug/kg	1
01008	Anthracene	120-12-7	0.85	J	0.70	ug/kg	1
01012	Pyrene	129-00-0	17.	J	5.5	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	5.6	J	1.6	ug/kg	1
01016	Chrysene	218-01-9	6.4	J	2.3	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	6.9	J	3.1	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	8.5	J	2.3	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	4.0	J	3.9	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	13.	J	3.1	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 19:48	Stephanie A Selis	22
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 15:39	Mark A Clark	1
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:28	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347775

826-6 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 14:00 by SM

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

826-6

Account Number: 11183

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Analysis Report

Lancaster Laboratories Sample No. SW 4347776

826-7 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 14:10 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

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826-7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.1	ug/kg	22
08184	Toluene	108-88-3	N.D.		2.1	ug/kg	22
08185	Ethylbenzene	100-41-4	N.D.		2.1	ug/kg	22
08188	Isopropylbenzene	98-82-8	N.D.		5.2	ug/kg	22
08189	Naphthalene	91-20-3	N.D.		10.	ug/kg	22
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		4.7	ug/kg	1
01007	Phenanthrene	85-01-8	5.1	J	2.4	ug/kg	1
01008	Anthracene	120-12-7	N.D.		0.71	ug/kg	1
01012	Pyrene	129-00-0	14.	J	5.5	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	4.1	J	1.6	ug/kg	1
01016	Chrysene	218-01-9	5.3	J	2.4	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	4.8	J	3.1	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	6.1	J	2.4	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		3.9	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	11.	J	3.1	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 11:37	Stephanie A Selis	22
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 16:56	Mark A Clark	1
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:30	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347776

826-7 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 14:10 by SM

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

826-7

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Analysis Report

Lancaster Laboratories Sample No. SW 4347777

826-8 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 14:20 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

826-8

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CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.1	ug/kg	23
08184	Toluene	108-88-3	8.1		2.1	ug/kg	23
08185	Ethylbenzene	100-41-4	4.8	J	2.1	ug/kg	23
08188	Isopropylbenzene	98-82-8	N.D.		5.2	ug/kg	23
08189	Naphthalene	91-20-3	N.D.		10.	ug/kg	23
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		23.	ug/kg	5
01007	Phenanthrene	85-01-8	130.		11.	ug/kg	5
01008	Anthracene	120-12-7	23.	J	3.4	ug/kg	5
01012	Pyrene	129-00-0	280.		26.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	110.		7.5	ug/kg	5
01016	Chrysene	218-01-9	98.		11.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	110.		15.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	110.		11.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	60.	J	19.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	170.		15.	ug/kg	5
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 20:26	Stephanie A Selis	23
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/14/2004 17:38	Mark A Clark	5

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Analysis Report

Lancaster Laboratories Sample No. SW 4347777

826-8 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 14:20 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

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826-8

03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:31	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347778

826-9 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected:09/07/2004 14:30 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

826-9

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CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.2		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		2.0	ug/kg	22
08184	Toluene	108-88-3	3.6	J	2.0	ug/kg	22
08185	Ethylbenzene	100-41-4	N.D.		2.0	ug/kg	22
08188	Isopropylbenzene	98-82-8	N.D.		5.0	ug/kg	22
08189	Naphthalene	91-20-3	N.D.		9.9	ug/kg	22
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	21.	J	4.5	ug/kg	1
01007	Phenanthrene	85-01-8	180.		2.3	ug/kg	1
01008	Anthracene	120-12-7	25.		0.68	ug/kg	1
01012	Pyrene	129-00-0	170.		5.3	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	48.		1.5	ug/kg	1
01016	Chrysene	218-01-9	74.		2.3	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	47.		3.0	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	47.		2.3	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	20.		3.8	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	68.		3.0	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	09/09/2004 17:23	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/14/2004 03:33	Stephanie A Selis	22
00941	PAH's in Solids by HPLC	SW-846 8310	1	09/15/2004 08:39	Mark A Clark	1
03338	PAH Solid Extraction	SW-846 3550B	1	09/09/2004 20:55	Karen L Beyer	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:34	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4347778

826-9 Grab Soil Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: 09/07/2004 14:30 by SM

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

826-9

Account Number: 11183

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Analysis Report

Lancaster Laboratories Sample No. G5 4347779

Trip Blank Methanol Sample
SUNOCO 826 - Philadelphia Refinery, PA

Collected: n.a.

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/23/2004 at 15:00
Discard: 10/24/2004

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PR-TB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08179	BTEX/MTBE/Isopropylbenz/Napht.					
08183	Benzene	71-43-2	N.D.	2.0	ug/kg	25
08184	Toluene	108-88-3	N.D.	2.0	ug/kg	25
08185	Ethylbenzene	100-41-4	N.D.	2.0	ug/kg	25
08188	Isopropylbenzene	98-82-8	N.D.	5.0	ug/kg	25
08189	Naphthalene	91-20-3	N.D.	10.	ug/kg	25

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	09/13/2004 13:32	Stephanie A Selis	25
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	09/09/2004 14:35	Nadine Fegley	n.a.

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc.
Reported: 09/23/04 at 03:01 PM

Group Number: 911205

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 04253820003B	Sample number(s): 4347770-4347778							
Moisture				100		99-101		
Batch number: 04253SLB026	Sample number(s): 4347770-4347778							
Fluorene	N.D.	4.0	ug/kg	89		71-106		
Phenanthrene	N.D.	2.0	ug/kg	89		73-112		
Anthracene	N.D.	0.60	ug/kg	90		68-117		
Pyrene	N.D.	4.7	ug/kg	89		67-117		
Benzo(a)anthracene	N.D.	1.3	ug/kg	90		72-115		
Chrysene	N.D.	2.0	ug/kg	90		71-108		
Benzo(b)fluoranthene	N.D.	2.7	ug/kg	94		74-118		
Benzo(a)pyrene	N.D.	2.0	ug/kg	86		68-116		
Indeno(1,2,3-cd)pyrene	N.D.	3.3	ug/kg	91		76-127		
Benzo(g,h,i)perylene	N.D.	2.7	ug/kg	90		73-116		
Batch number: 04256A31A	Sample number(s): 4347771,4347776,4347779							
Benzene	N.D.	2.0	ug/kg	98		86-113		
Toluene	N.D.	2.0	ug/kg	90		81-119		
Ethylbenzene	N.D.	2.0	ug/kg	99		89-112		
Isopropylbenzene	N.D.	5.0	ug/kg	100		91-111		
Naphthalene	N.D.	10.	ug/kg	88		70-125		
Batch number: 04256A31B	Sample number(s): 4347770,4347772,4347774-4347775,4347777-4347778							
Benzene	N.D.	2.0	ug/kg	98		86-113		
Toluene	N.D.	2.0	ug/kg	90		81-119		
Ethylbenzene	N.D.	2.0	ug/kg	99		89-112		
Isopropylbenzene	N.D.	5.0	ug/kg	100		91-111		
Naphthalene	N.D.	10.	ug/kg	88		70-125		
Batch number: 04259A31A	Sample number(s): 4347773							
Benzene	N.D.	2.0	ug/kg	98	98	86-113	0	30
Toluene	N.D.	2.0	ug/kg	89	90	81-119	0	30
Ethylbenzene	N.D.	2.0	ug/kg	98	98	89-112	0	30
Isopropylbenzene	N.D.	5.0	ug/kg	99	100	91-111	1	30
Naphthalene	N.D.	10.	ug/kg	85	87	70-125	2	30

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 04253820003B	Sample number(s): 4347770-4347778								

*- 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.

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 911205
Reported: 09/23/04 at 03:01 PM

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Moisture						82.0	81.9	0	15
Batch number: 04253SLB026	Sample number(s): 4347770-4347778								
Fluorene	83	83	69-103	0	50				
Phenanthrene	-56*	-42*	41-153	12	50				
Anthracene	39	40	1-158	1	50				
Pyrene	46	26	3-143	15	50				
Benzo(a)anthracene	-61*	-75*	28-54	10	50				
Chrysene	36	31	1-169	4	50				
Benzo(b)fluoranthene	(2)	(2)	47-122	23	50				
Benzo(a)pyrene	(2)	(2)	45-139	29	50				
Indeno(1,2,3-cd)pyrene	60	73	1-198	11	50				
Benzo(g,h,i)perylene	74	49	34-123	16	50				
Batch number: 04256A31A	Sample number(s): 4347771,4347776,4347779								
Benzene	79	85	52-135	8	30				
Toluene	72	78	59-129	9	30				
Ethylbenzene	79	87	56-132	9	30				
Isopropylbenzene	80	88	63-112	9	30				
Naphthalene	76	87	53-122	13	30				
Batch number: 04256A31B	Sample number(s): 4347770,4347772,4347774-4347775,4347777-4347778								
Benzene	79	85	52-135	8	30				
Toluene	72	78	59-129	9	30				
Ethylbenzene	79	87	56-132	9	30				
Isopropylbenzene	80	88	63-112	9	30				
Naphthalene	76	87	53-122	13	30				

Surrogate Quality Control

Analysis Name: PAH's in Solids by HPLC
Batch number: 04253SLB026

	Nitrobenzene	Triphenylene
4347770	80	424*
4347771	87	922*
4347772	85	290*
4347773	93	150
4347774	83	102
4347775	87	98
4347776	89	101
4347777	81	102
4347778	89	94
Blank	89	100
LCS	86	97
MS	87	524*
MSD	87	222*
Limits:	59-121	48-161

Analysis Name: BTEX/MTBE/Isopropylbenz/Napht.
Batch number: 04256A31A

*- 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.

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: Secor International, Inc. Group Number: 911205
Reported: 09/23/04 at 03:01 PM

Surrogate Quality Control

	Trifluorotoluene-P
4347771	116
4347776	119
4347779	96
Blank	108
LCS	111
MS	80
MSD	85
Limits:	72-122

Analysis Name: BTEX/MTBE/Isopropylbenz/Napht.
Batch number: 04256A31B

	Trifluorotoluene-P
4347770	89
4347772	91
4347774	86
4347775	87
4347777	86
4347778	89
Blank	106
LCS	111
MS	80
MSD	85
Limits:	72-122

Analysis Name: BTEX/MTBE/Isopropylbenz/Napht.
Batch number: 04259A31A

	Trifluorotoluene-P
4347773	80
Blank	106
LCS	109
LCSD	110
Limits:	72-122

*- 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.

Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
Where quality is a science.

For Lancaster Laboratories use only
Acct. # 11183 Group# 911205 Sample # 4347776-9

COC # 0068069

1 OF 1

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: SECOR Acct. #:
Project Name/#: SUNOCO- 826 PWSID #:
Project Manager: S. MORESCALCHI P.O.#:
Sampler: S. MORESCALCHI Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 1194412

(2) (3) (4) (5) (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water (☐ Potable ☐ NPDES)	Other	Total # of Containers	PADEP SHORT LIST - FUEL OIL #4,5&6 & USED MOTOR OIL (NO LEAD)	SPLP - FUEL OIL 4,5&6 USED MOTOR OIL	Remarks	Temperature of sample upon receipt (if requested)
826-1	09-07-04	1230	✓		✓			4	✓		VIAL # 011476	HOLD SPLP
826-2	↓	1250	✓		✓			4	✓		011479	↓
826-3	↓	1320	✓		✓			4	✓		011482	↓
826-4	↓	1340	✓		✓			4	✓		011483	↓
826-5	↓	1350	✓		✓			4	✓		011480	↓
826-6	↓	1400	✓		✓			4	✓		011477	↓
826-7	↓	1410	✓		✓			4	✓		011474	↓
826-8	↓	1420	✓		✓			4	✓		011485	↓
826-9	↓	1430	✓		✓			4	✓		011481	↓
TRIP BLANK							✓	1	✓		→ MEET PADEP MSC'S	

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.) P-7
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
K. [signature]	9-2-04	1515			
[signature]	09-02-04	0950	Marvin McGallicker	9/8/04	9:50
Marvin McGallicker	9/8/04	19:30			
			Jessie [signature]	9/8/04	1930

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
2425 New Holland Pike • Lancaster, PA 17601

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
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
ug	microgram(s)	**mg**	milligram(s)
ml	milliliter(s)	**l**	liter(s)
m3	cubic meter(s)	**ul**	microliter(s)

< 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

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

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. All other results are reported on an as-received basis.

U.S. EPA CLP 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 quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
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 sample 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.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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PB 843, 844, 845 and 849

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March 12, 2007

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-843 (PA Registration #111A)**
Closure-in-Place, Confirmatory Sampling Activities Report
Sunoco, Inc. (R&M) –Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID# 51-19781

Dear Mr. Rosendorn:

This letter summarizes the confirmatory sampling activities that were conducted in the vicinity of aboveground storage tank (AST) 843. The project site is located at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Confirmatory sampling activities were conducted for the closure-in-place of AST 843. A Pennsylvania Department of Environmental Protection (PADEP) Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on July 21, 2006 by SUNOCO.

Soil Sampling Activities

AST 843 is a 150-foot diameter AST that previously contained recovered fuel oil. For ASTs with a diameter greater than 90 feet, the PADEP Closure Requirements for Aboveground Storage Tank Systems (Closure Requirements) specifies the collection of soil samples from both the perimeter of the AST and from below the AST is to be determined upon consultation with the DEP regional office. Per conversation with Walter Payne of PADEP the samples were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter. As a result of previous unsuccessful attempts to collect soil samples with a hand auger from below the center of other ASTs , an Alternative Confirmatory Sampling Plan for AST Closures (Alternative Plan) was submitted by SUNOCO to PADEP on March 16, 2006. The Alternative Plan proposed to collect three soil samples from angled drilling in lieu of sampling directly beneath the AST. The angled drilling would take place external to the tank shell and would be directed towards the center of the tank to a vertical depth of at least 5 feet. The Alternative Plan was approved by Walter Payne of PADEP in an April 5, 2006 letter with the stipulation that the number of soil samples to be collected matched the number

of soil samples specified in the Closure Requirements. To satisfy the Closure Requirements a total of six perimeter soil samples and three angled soil samples were proposed to be collected from AST 843. In addition three soil samples were collected below the above ground piping and nine soil samples from underground piping at AST 843.

On August 23, 2006, a total of six perimeter soil samples (AST-843 Perimeter 1, AST-843 Perimeter 2, AST-843 Perimeter 3, AST-843 Perimeter 4, AST-843 Perimeter-5 and AST-843 Perimeter 6) and three angled soil samples (AST-843 Sub-floor 1, AST-843 Sub-floor 2 and AST-843 Sub-floor 3) were collected using a truck mounted Geoprobe® rig. Soil samples AST-843 Perimeter 1 through AST-843 Perimeter 6 were collected at a depth of approximately 3 feet below grade (fbg). Soil samples AST-843 Sub-floor 1, AST-843 Sub-floor 2, and AST-843 Sub-floor 3 were collected at a vertical depth of approximately 5 fbg (the borings were advanced 7 feet at a 45° angle under AST 843).

As per the Closure Requirements at least one soil sample must be collected from aboveground or underground piping, biased towards pipe junctures/joints and control valves. A total of nine soil samples were collected on August 23, 2006 from two underground pipelines and one aboveground pipeline at AST 843. Using a truck mounted Geoprobe® rig, to obtain soil samples from the two underground pipes, soil samples (AST-843 Line 1, AST-843 Line 2, AST-843 Line 3, AST-843 Line 4, AST-843 Line 5 and AST-843 Line 6) were collected approximately 5.5-6 fbg. One aboveground pipe was observed at AST 843. Soil samples AST-843 Line 7, AST-843 Line 8 and AST-843 Line 9 were collected directly below (0-6 inches below grade) the aboveground. Soil sampling locations are depicted on **Figure 2**.

Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (with the exception of lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, isopropylbenzene and naphthalene by EPA Method 5035A/8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct

contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended regarding the closure-in-place of AST 843.

A copy of the PADEP Aboveground Storage Tank System Closure Report Form is included in **Appendix B**.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

Sincerely,
SECOR International Incorporated

Elizabeth Baldwin

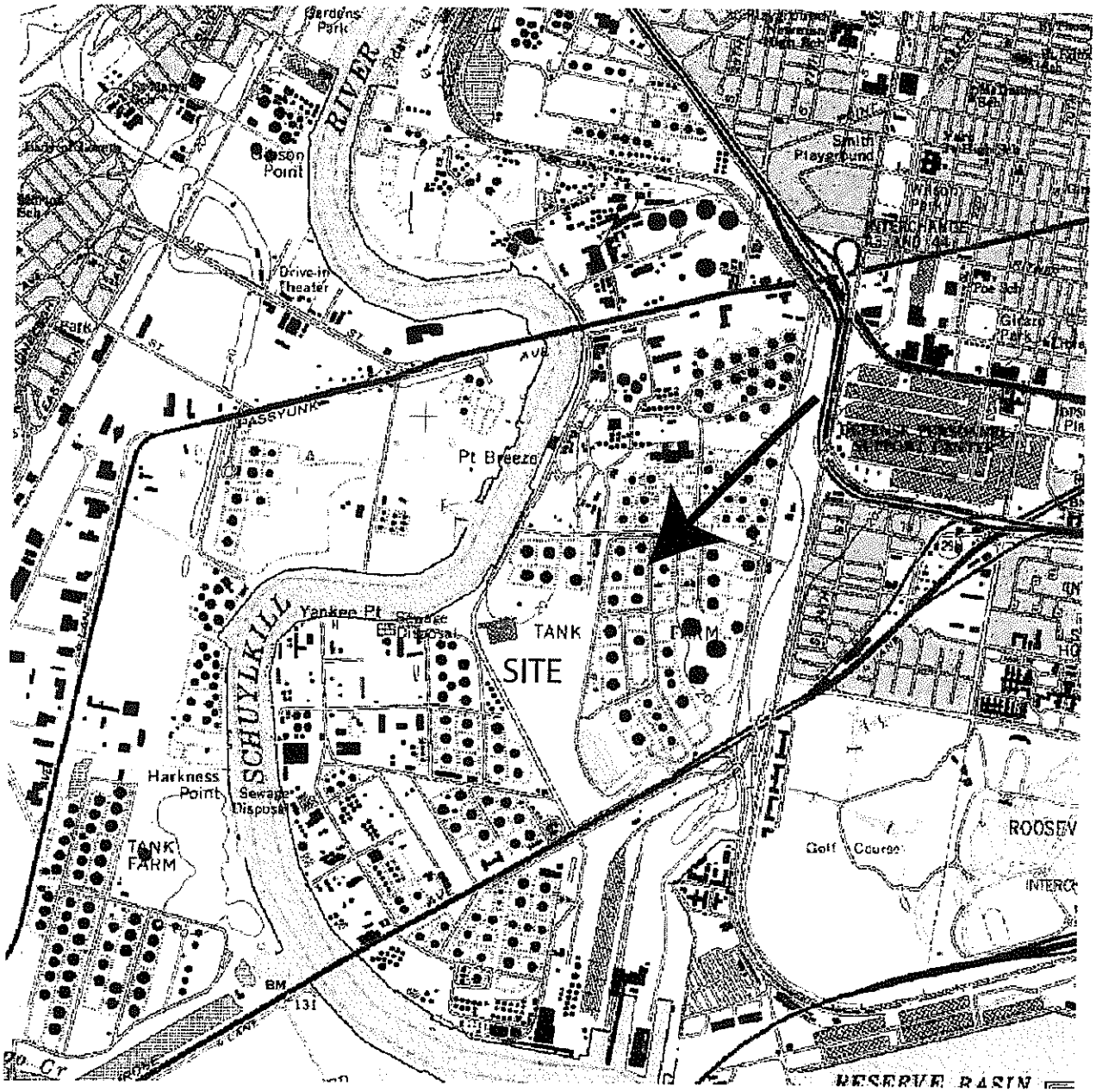
Elizabeth Baldwin
Staff

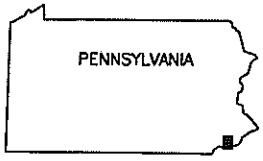
Casey Yetman

Casey Yetman
Project Manager

c: James Oppenheim (Sunoco)
Steve Baggett (SECOR)
Project File

FIGURES





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

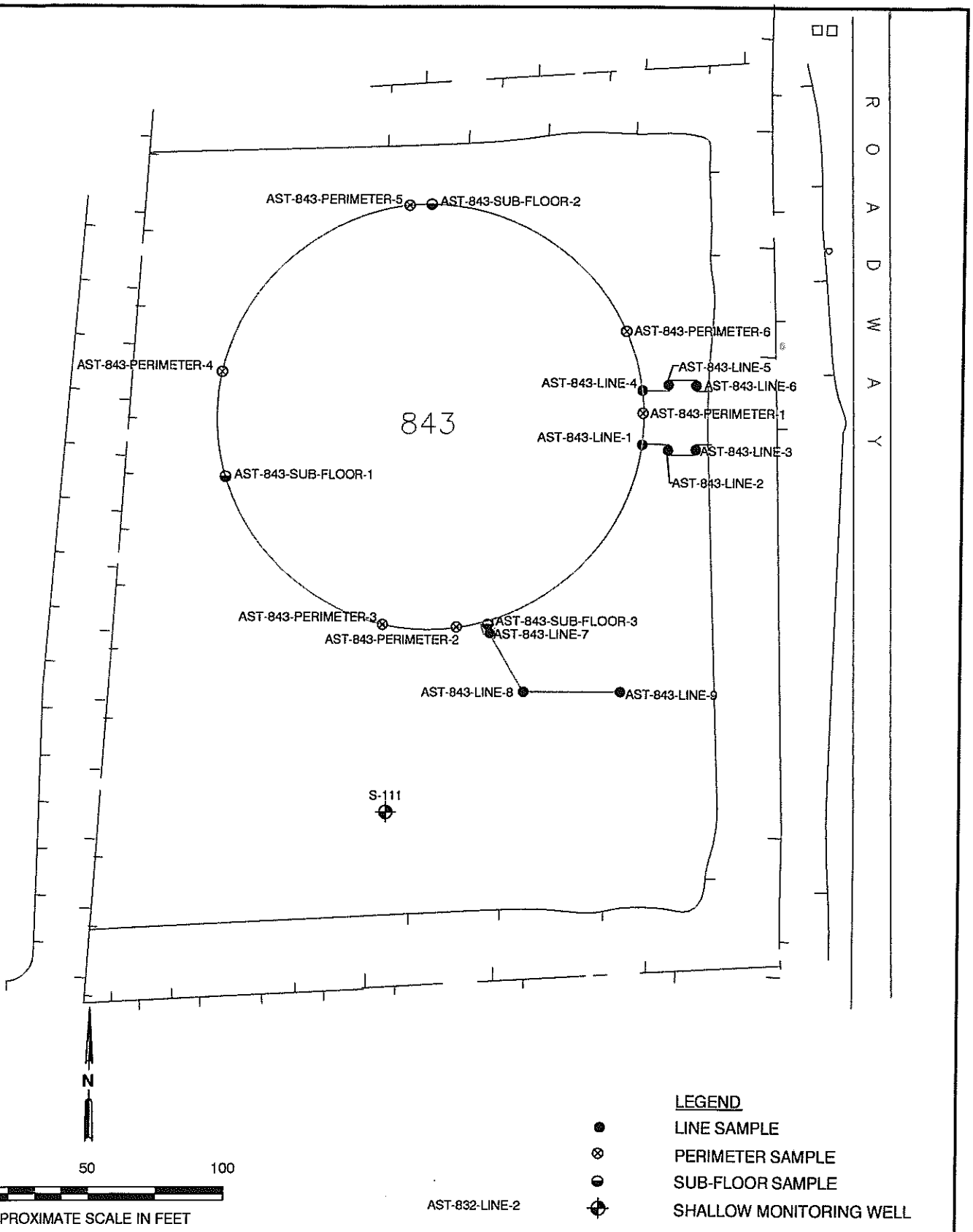
SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:
SUNOCO, INC.
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

SITE LOCATION MAP
PHILADELPHIA REFINERY

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01095	KEF	CY		04/17/2006



SECOR 102 PICKERING WAY, SUITE 200 EXTON, PENNSYLVANIA PHONE: (484) 875-3075/875-9266 (FAX)	FOR: SUNOCO PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**AST-843** **CLOSURE SAMPLING LOCATIONS**		FIGURE: **2**
	JOB NUMBER: 62SU.01185.06/0003	DRAWN BY: KEF	CHECKED BY: CY	APPROVED BY:	DATE: 01/08/2007

TABLES

Summary of Soil Analytical Results
AST 843
Sunoco Philadelphia Refinery

Sample Identification	MSCs			AST-843 Perimeter-1	AST-843 Perimeter-2	AST-843 Perimeter-3	AST-843 Perimeter-4	AST-843 Perimeter-5	AST-843 Perimeter-6	AST-843 Line 1	AST-843 Line 2	AST-843 Line 3
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	5.5-6	5.5-6	5.5-6
Sample Collection Date				8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006
VOCs												
Benzene	210,000	240,000	500	ND (31)	37 J	ND (26)	ND (24)	ND (24)	ND (24)	ND (28)	ND (28)	ND (26)
Toluene	10,000,000	10,000,000	100,000	ND (63)	ND (55)	ND (53)	ND (49)	ND (47)	ND (48)	ND (56)	ND (55)	ND (52)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (63)	ND (55)	ND (53)	ND (49)	ND (47)	ND (48)	ND (56)	ND (55)	ND (52)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (63)	ND (55)	ND (53)	ND (49)	ND (47)	ND (48)	110 J	ND (55)	ND (52)
Naphthalene	56,000,000	190,000,000	25,000	ND (63)	ND (55)	ND (53)	ND (49)	ND (47)	ND (48)	ND (56)	ND (55)	ND (52)
SVOCs												
Anthracene	190,000,000	190,000,000	350,000	ND (40)	600	ND (38)	ND (36)	ND (36)	ND (38)	140 J	ND (40)	ND (40)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (40)	860	ND (38)	ND (36)	ND (36)	ND (38)	120 J	ND (40)	ND (40)
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (40)	510	ND (38)	ND (36)	ND (36)	ND (38)	67 J	ND (40)	ND (40)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (40)	640	ND (38)	ND (36)	ND (36)	ND (38)	86 J	ND (40)	ND (40)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	ND (40)	230	ND (38)	ND (36)	ND (36)	ND (38)	ND (38)	ND (40)	ND (40)
Chrysene	11,000,000	190,000,000	230,000	ND (40)	770	ND (38)	ND (36)	ND (36)	ND (38)	100 J	ND (40)	ND (40)
Fluorene	110,000,000	190,000,000	3,800,000	ND (40)	300	ND (38)	ND (36)	ND (36)	ND (38)	390	ND (40)	ND (40)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (40)	280	ND (38)	ND (36)	ND (36)	ND (38)	ND (38)	ND (40)	ND (40)
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (40)	2,100	ND (38)	ND (36)	ND (36)	ND (38)	800	ND (40)	ND (40)
Pyrene	84,000,000	190,000,000	2,200,000	ND (40)	1,500	ND (38)	ND (36)	ND (36)	ND (38)	310	ND (40)	ND (40)

Notes:

FBG = Feet Below Grade

All concentrations are in ug/kg (micrograms per kilogram)

ND (30) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

Summary of Soil Analytical Results
AST 843
Sunoco Philadelphia Refinery

Sample Identification Sample Collection Depth (FBG) Sample Collection Date	MSCs Direct Contact, Non-residential, 0-2 feet (1)	MSCs Direct Contact, Non-residential, 2-15 feet (1)	MSCs Groundwater, Used Aquifer, Non-residential (2)	AST-843 Line 4 5.5-6 8/23/2006	AST-843 Line 5 5.5-6 8/23/2006	AST-843 Line 6 5.5-6 8/23/2006	AST-843 Line 7 0-0.5 8/23/2006	AST-843 Line 8 0-0.5 8/23/2006	AST-843 Line 9 0-0.5 8/23/2006	AST-843 Sub-floor 1 5-5.5 8/23/2006	AST-843 Sub-floor 2 5-5.5 8/23/2006	AST-843 Sub-floor 3 5-5.5 8/23/2006
VOCs												
Benzene	210,000	240,000	500	ND (25)	ND (27)	ND (29)	ND (25)	ND (27)	35 J	ND (23)	ND (24)	ND (23)
Toluene	10,000,000	10,000,000	100,000	ND (50)	ND (55)	ND (57)	ND (49)	ND (55)	ND (52)	ND (45)	ND (48)	ND (47)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (50)	ND (55)	ND (57)	ND (49)	ND (55)	ND (52)	ND (45)	ND (48)	ND (47)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (50)	ND (55)	1,400	ND (49)	ND (55)	ND (52)	ND (45)	ND (48)	ND (47)
Naphthalene	56,000,000	190,000,000	25,000	ND (50)	ND (55)	67 J	ND (49)	ND (55)	ND (52)	ND (45)	ND (48)	ND (47)
SVOCs												
Anthracene	190,000,000	190,000,000	350,000	ND (39)	ND (39)	ND (78)	ND (37)	ND (180)	ND (37)	ND (35)	ND (37)	ND (37)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (39)	ND (39)	130 J	310	340 J	87 J	ND (35)	ND (37)	ND (37)
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (39)	ND (39)	100 J	340	400 J	65 J	ND (35)	ND (37)	ND (37)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (39)	ND (39)	100 J	490	620 J	99 J	ND (35)	ND (37)	ND (37)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	ND (39)	ND (39)	ND (78)	280	570 J	85 J	ND (35)	ND (37)	ND (37)
Chrysene	11,000,000	190,000,000	230,000	ND (39)	ND (39)	230 J	410	470 J	110 J	ND (35)	ND (37)	ND (37)
Fluorene	110,000,000	190,000,000	3,800,000	ND (39)	ND (39)	1,000	ND (37)	ND (180)	ND (37)	ND (35)	ND (37)	ND (37)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (39)	ND (39)	ND (78)	300	400 J	54 J	ND (35)	ND (37)	ND (37)
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (39)	ND (39)	2,200	140 J	260 J	160 J	ND (35)	ND (37)	ND (37)
Pyrene	84,000,000	190,000,000	2,200,000	ND (39)	ND (39)	370 J	490	530 J	170 J	ND (35)	ND (37)	ND (37)

Notes:

FBG = Feet Below Grade

All concentrations are in ug/kg (micrograms per kilogram)

ND (30) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Laboratory Analytical Report

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:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1003265. Samples arrived at the laboratory on Friday, August 25, 2006.

Client Description	Lancaster Labs Number
843 Perimeter 1 Grab Soil Sample	4851917
843 Perimeter 2 Grab Soil Sample	4851918
843 Perimeter 3 Grab Soil Sample	4851919
843 Perimeter 4 Grab Soil Sample	4851920
843 Perimeter 5 Grab Soil Sample	4851921
843 Perimeter 6 Grab Soil Sample	4851922
843 Line 1 Grab Soil Sample	4851923
843 Line 2 Grab Soil Sample	4851924
843 Line 3 Grab Soil Sample	4851925
843 Line 4 Grab Soil Sample	4851926
843 Line 5 Grab Soil Sample	4851927
843 Line 6 Grab Soil Sample	4851928
843 Line 7 Grab Soil Sample	4851929
843 Line 8 Grab Soil Sample	4851930
843 Line 9 Grab Soil Sample	4851931
843 Sub 1 Grab Soil Sample	4851932
843 Sub 2 Grab Soil Sample	4851933
843 Sub 3 Grab Soil Sample	4851934

1 COPY TO SECOR International, Inc Attn: Casey Yetman

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Analysis Report

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Marla S. Lord

Marla S. Lord
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851917

843 Perimeter 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843P1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.2	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	40.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	31.	ug/kg	52.52
05466	Toluene	108-88-3	N.D.	63.	ug/kg	52.52
05474	Ethylbenzene	100-41-4	N.D.	63.	ug/kg	52.52
05479	Isopropylbenzene	98-82-8	N.D.	63.	ug/kg	52.52
05498	Naphthalene	91-20-3	N.D.	63.	ug/kg	52.52

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 22:27	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 06:11	Stephanie A Selis	52.52

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851917

843 Perimeter 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
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102 Pickering Way
Exton PA 19341

843P1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:15	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851918

843 Perimeter 2 Grab Soil Sample

SUN PHL PB 843
Collected: 08/23/2006 09:08 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843P2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,500.		39.	ug/kg	1
03768	Fluorene	86-73-7	300.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	2,100.		39.	ug/kg	1
03776	Anthracene	120-12-7	600.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	860.		39.	ug/kg	1
03782	Chrysene	218-01-9	770.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	640.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	510.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	280.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	230.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	37.	J	28.	ug/kg	46.77
05466	Toluene	108-88-3	N.D.		55.	ug/kg	46.77
05474	Ethylbenzene	100-41-4	N.D.		55.	ug/kg	46.77
05479	Isopropylbenzene	98-82-8	N.D.		55.	ug/kg	46.77
05498	Naphthalene	91-20-3	N.D.		55.	ug/kg	46.77

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.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 23:35	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 06:33	Stephanie A Selis	46.77

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Analysis Report

Lancaster Laboratories Sample No. SW 4851918

843 Perimeter 2 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:08 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Suite 200
102 Pickering Way
Exton PA 19341

843P2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:16	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851919

843 Perimeter 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:01 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Exton PA 19341

843P3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.4	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	38.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	26.	ug/kg	46.73
05466	Toluene	108-88-3	N.D.	53.	ug/kg	46.73
05474	Ethylbenzene	100-41-4	N.D.	53.	ug/kg	46.73
05479	Isopropylbenzene	98-82-8	N.D.	53.	ug/kg	46.73
05498	Naphthalene	91-20-3	N.D.	53.	ug/kg	46.73

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 23:58	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 06:56	Stephanie A Selis	46.73

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Analysis Report

Lancaster Laboratories Sample No. SW 4851919

843 Perimeter 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:01 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Suite 200
102 Pickering Way
Exton PA 19341

843P3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:17	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851920

843 Perimeter 4 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 08:50 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843P4

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.7	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	36.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	36.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	24.	ug/kg	45.45
05466	Toluene	108-88-3	N.D.	49.	ug/kg	45.45
05474	Ethylbenzene	100-41-4	N.D.	49.	ug/kg	45.45
05479	Isopropylbenzene	98-82-8	N.D.	49.	ug/kg	45.45
05498	Naphthalene	91-20-3	N.D.	49.	ug/kg	45.45

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	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 00:21	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 07:18	Stephanie A Selis	45.45

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Analysis Report

Lancaster Laboratories Sample No. SW 4851920

843 Perimeter 4 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 08:50 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Suite 200
102 Pickering Way
Exton PA 19341

843P4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:18	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851921

843 Perimeter 5 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:14 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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102 Pickering Way
Exton PA 19341

843P5

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	36.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	36.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	24.	ug/kg	44.09
05466	Toluene	108-88-3	N.D.	47.	ug/kg	44.09
05474	Ethylbenzene	100-41-4	N.D.	47.	ug/kg	44.09
05479	Isopropylbenzene	98-82-8	N.D.	47.	ug/kg	44.09
05498	Naphthalene	91-20-3	N.D.	47.	ug/kg	44.09

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 00:43	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 07:41	Stephanie A Selis	44.09

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Analysis Report

Lancaster Laboratories Sample No. SW 4851921

843 Perimeter 5 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:14 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843P5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:19	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851922

843 Perimeter 6 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843P6

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.7	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	38.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	24.	ug/kg	42.23
05466	Toluene	108-88-3	N.D.	48.	ug/kg	42.23
05474	Ethylbenzene	100-41-4	N.D.	48.	ug/kg	42.23
05479	Isopropylbenzene	98-82-8	N.D.	48.	ug/kg	42.23
05498	Naphthalene	91-20-3	N.D.	48.	ug/kg	42.23

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 09:48	William C Schwebel	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 01:06	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 08:04	Stephanie A Selis	42.23

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Analysis Report

Lancaster Laboratories Sample No. SW 4851922

843 Perimeter 6 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 09:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843P6

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:20	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851923

843 Line 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:34 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Exton PA 19341

843L1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	12.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	310.		38.	ug/kg	1
03768	Fluorene	86-73-7	390.		38.	ug/kg	1
03775	Phenanthrene	85-01-8	800.		38.	ug/kg	1
03776	Anthracene	120-12-7	140.	J	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	120.	J	38.	ug/kg	1
03782	Chrysene	218-01-9	100.	J	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	86.	J	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	67.	J	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	49.02
05466	Toluene	108-88-3	N.D.		56.	ug/kg	49.02
05474	Ethylbenzene	100-41-4	N.D.		56.	ug/kg	49.02
05479	Isopropylbenzene	98-82-8	110.	J	56.	ug/kg	49.02
05498	Naphthalene	91-20-3	N.D.		56.	ug/kg	49.02

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 01:28	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 08:26	Stephanie A Selis	49.02

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Analysis Report

Lancaster Laboratories Sample No. SW 4851923

843 Line 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:34 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:21	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851924

843 Line 2 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.8	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	40.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	28.	ug/kg	46.13
05466	Toluene	108-88-3	N.D.	55.	ug/kg	46.13
05474	Ethylbenzene	100-41-4	N.D.	55.	ug/kg	46.13
05479	Isopropylbenzene	98-82-8	N.D.	55.	ug/kg	46.13
05498	Naphthalene	91-20-3	N.D.	55.	ug/kg	46.13

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	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 01:51	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 08:49	Stephanie A Selis	46.13

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Analysis Report

Lancaster Laboratories Sample No. SW 4851924

843 Line 2 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:22	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851925

843 Line 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:48 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	40.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	26.	ug/kg	43.71
05466	Toluene	108-88-3	N.D.	52.	ug/kg	43.71
05474	Ethylbenzene	100-41-4	N.D.	52.	ug/kg	43.71
05479	Isopropylbenzene	98-82-8	N.D.	52.	ug/kg	43.71
05498	Naphthalene	91-20-3	N.D.	52.	ug/kg	43.71

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 02:14	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 09:11	Stephanie A Selis	43.71

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Analysis Report

Lancaster Laboratories Sample No. SW 4851925

843 Line 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:48 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:23	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851926

843 Line 4 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:59 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L4

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.1	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	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	25.	ug/kg	43.03
05466	Toluene	108-88-3	N.D.	50.	ug/kg	43.03
05474	Ethylbenzene	100-41-4	N.D.	50.	ug/kg	43.03
05479	Isopropylbenzene	98-82-8	N.D.	50.	ug/kg	43.03
05498	Naphthalene	91-20-3	N.D.	50.	ug/kg	43.03

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 02:36	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 09:34	Stephanie A Selis	43.03

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Analysis Report

Lancaster Laboratories Sample No. SW 4851926

843 Line 4 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:59 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:24	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851927

843 Line 5 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:06 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L5

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.0	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	27.	ug/kg	46.73
05466	Toluene	108-88-3	N.D.	55.	ug/kg	46.73
05474	Ethylbenzene	100-41-4	N.D.	55.	ug/kg	46.73
05479	Isopropylbenzene	98-82-8	N.D.	55.	ug/kg	46.73
05498	Naphthalene	91-20-3	N.D.	55.	ug/kg	46.73

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 02:59	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 09:57	Stephanie A Selis	46.73

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Analysis Report

Lancaster Laboratories Sample No. SW 4851927

843 Line 5 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:06 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:25	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851928

843 Line 6 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	370.	J	78.	ug/kg	1
03768	Fluorene	86-73-7	1,000.		78.	ug/kg	1
03775	Phenanthrene	85-01-8	2,200.		78.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		78.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	130.	J	78.	ug/kg	1
03782	Chrysene	218-01-9	230.	J	78.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	100.	J	78.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	100.	J	78.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		78.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		78.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits were not attained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	48.64
05466	Toluene	108-88-3	N.D.		57.	ug/kg	48.64
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	48.64
05479	Isopropylbenzene	98-82-8	1,400.		57.	ug/kg	48.64
05498	Naphthalene	91-20-3	67.	J	57.	ug/kg	48.64

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851928

843 Line 6 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L6

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 03:21	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 10:19	Stephanie A Selis	48.64
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 15:26	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851929

843 Line 7 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:18 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	9.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	490.		37.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		37.	ug/kg	1
03775	Phenanthrene	85-01-8	140.	J	37.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	310.		37.	ug/kg	1
03782	Chrysene	218-01-9	410.		37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	490.		37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	340.		37.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	300.		37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	280.		37.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		25.	ug/kg	44.52
05466	Toluene	108-88-3	N.D.		49.	ug/kg	44.52
05474	Ethylbenzene	100-41-4	N.D.		49.	ug/kg	44.52
05479	Isopropylbenzene	98-82-8	N.D.		49.	ug/kg	44.52
05498	Naphthalene	91-20-3	N.D.		49.	ug/kg	44.52

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 03:44	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 10:42	Stephanie A Selis	44.52

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Analysis Report

Lancaster Laboratories Sample No. SW 4851929

843 Line 7 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:18 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843L7

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 14:04	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851930

843 Line 8 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:25 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

843L8

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	8.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	530.	J	180.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		180.	ug/kg	1
03775	Phenanthrene	85-01-8	260.	J	180.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		180.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	340.	J	180.	ug/kg	1
03782	Chrysene	218-01-9	470.	J	180.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	620.	J	180.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	400.	J	180.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	400.	J	180.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	570.	J	180.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits were not attained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		27.	ug/kg	50.05
05466	Toluene	108-88-3	N.D.		55.	ug/kg	50.05
05474	Ethylbenzene	100-41-4	N.D.		55.	ug/kg	50.05
05479	Isopropylbenzene	98-82-8	N.D.		55.	ug/kg	50.05
05498	Naphthalene	91-20-3	N.D.		55.	ug/kg	50.05

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1

Lancaster Laboratories Sample No. SW 4851930

843 Line 8 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:25 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L8

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 04:06	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 11:04	Stephanie A Selis	50.05
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 13:58	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851931

843 Line 9 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:32 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L9

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	9.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	170.	J	37.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		37.	ug/kg	1
03775	Phenanthrene	85-01-8	160.	J	37.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	87.	J	37.	ug/kg	1
03782	Chrysene	218-01-9	110.	J	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	99.	J	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	65.	J	37.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	54.	J	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	85.	J	37.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	35.	J	26.	ug/kg	46.69
05466	Toluene	108-88-3	N.D.		52.	ug/kg	46.69
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	46.69
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	46.69
05498	Naphthalene	91-20-3	N.D.		52.	ug/kg	46.69

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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 12:05	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 15:13	Robin C Runkle	46.69

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Analysis Report

Lancaster Laboratories Sample No. SW 4851931

843 Line 9 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 12:32 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843L9

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 14:00	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851932

843 Sub 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843S1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	5.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	35.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	35.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	35.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	35.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	35.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	35.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	35.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	35.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	35.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	35.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	23.	ug/kg	42.88
05466	Toluene	108-88-3	N.D.	45.	ug/kg	42.88
05474	Ethylbenzene	100-41-4	N.D.	45.	ug/kg	42.88
05479	Isopropylbenzene	98-82-8	N.D.	45.	ug/kg	42.88
05498	Naphthalene	91-20-3	N.D.	45.	ug/kg	42.88

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 12:27	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 15:35	Robin C Runkle	42.88

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Analysis Report

Lancaster Laboratories Sample No. SW 4851932

843 Sub 1 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843S1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 13:57	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851933

843 Sub 2 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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843S2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	8.8	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	37.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	37.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	37.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	37.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	37.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	37.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	24.	ug/kg	43.4
05466	Toluene	108-88-3	N.D.	48.	ug/kg	43.4
05474	Ethylbenzene	100-41-4	N.D.	48.	ug/kg	43.4
05479	Isopropylbenzene	98-82-8	N.D.	48.	ug/kg	43.4
05498	Naphthalene	91-20-3	N.D.	48.	ug/kg	43.4

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 12:50	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 15:58	Robin C Runkle	43.4

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Analysis Report

Lancaster Laboratories Sample No. SW 4851933

843 Sub 2 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 10:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
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Exton PA 19341

843S2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 14:01	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851934

843 Sub 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

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Exton PA 19341

843S3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	9.7	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	37.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	37.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	37.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	37.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	37.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	37.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	23.	ug/kg	42.41
05466	Toluene	108-88-3	N.D.	47.	ug/kg	42.41
05474	Ethylbenzene	100-41-4	N.D.	47.	ug/kg	42.41
05479	Isopropylbenzene	98-82-8	N.D.	47.	ug/kg	42.41
05498	Naphthalene	91-20-3	N.D.	47.	ug/kg	42.41

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 13:12	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 16:21	Robin C Runkle	42.41

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Analysis Report

Lancaster Laboratories Sample No. SW 4851934

843 Sub 3 Grab Soil Sample

SUN PHL PB 843
Collected:08/23/2006 11:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/08/2006 at 16:43
Discard: 09/23/2006

SECOR International, Inc
Suite 200
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Exton PA 19341

843S3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 14:03	Larry E Bevins	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/08/06 at 04:43 PM

Group Number: 1003265

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06238SLE026	Sample number(s): 4851917-4851934							
Pyrene	N.D.	33.	ug/kg	103		67-116		
Fluorene	N.D.	33.	ug/kg	96		66-115		
Phenanthrene	N.D.	33.	ug/kg	99		70-107		
Anthracene	N.D.	33.	ug/kg	97		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	97		73-111		
Chrysene	N.D.	33.	ug/kg	95		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	81		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	89		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	98		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	87		66-120		
Batch number: 06241820002B	Sample number(s): 4851917-4851922							
Moisture				100		99-101		
Batch number: 06241820003A	Sample number(s): 4851923-4851931							
Moisture				100		99-101		
Batch number: 06241820003B	Sample number(s): 4851932-4851934							
Moisture				100		99-101		
Batch number: R062412AA	Sample number(s): 4851917-4851930							
Benzene	N.D.	25.	ug/kg	96	98	77-119	2	30
Toluene	N.D.	50.	ug/kg	96	99	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	93	95	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	87	88	79-117	2	30
Naphthalene	N.D.	50.	ug/kg	78	83	52-121	6	30
Batch number: R062412AB	Sample number(s): 4851931-4851934							
Benzene	N.D.	25.	ug/kg	96	98	77-119	2	30
Toluene	N.D.	50.	ug/kg	96	99	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	93	95	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	87	88	79-117	2	30
Naphthalene	N.D.	50.	ug/kg	78	83	52-121	6	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: 06238SLE026	Sample number(s): 4851917-4851934 UNSPK: 4851917								
Pyrene	103	102	28-151	1	30				
Fluorene	97	94	47-126	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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003265
Reported: 09/08/06 at 04:43 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
Phenanthrene	100	97	35-144	3	30				
Anthracene	97	96	38-142	1	30				
Benzo(a)anthracene	99	96	41-136	3	30				
Chrysene	94	93	40-135	1	30				
Benzo(b)fluoranthene	78	76	29-151	3	30				
Benzo(a)pyrene	87	83	37-144	5	30				
Indeno(1,2,3-cd)pyrene	96	91	39-141	5	30				
Benzo(g,h,i)perylene	85	81	33-145	5	30				
Batch number: 06241820002B	Sample number(s): 4851917-4851922					BKG: P851912			
Moisture						17.5	17.2	2	15
Batch number: 06241820003A	Sample number(s): 4851923-4851931					BKG: 4851925			
Moisture						16.3	16.4	0	15
Batch number: 06241820003B	Sample number(s): 4851932-4851934					BKG: P852385			
Moisture						12.3	12.8	4	15

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06238SLE026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851917	93	89	107
4851918	93	92	104
4851919	97	91	110
4851920	96	93	112
4851921	97	96	111
4851922	81	81	94
4851923	98	92	106
4851924	93	88	102
4851925	93	90	105
4851926	95	94	110
4851927	81	78	94
4851928	119	87	99
4851929	97	95	108
4851930	97	102	108
4851931	94	96	101
4851932	95	94	101
4851933	94	94	103
4851934	92	91	102
Blank	97	95	97
LCS	95	91	107
MS	95	94	106
MSD	90	88	102

*- 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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003265
Reported: 09/08/06 at 04:43 PM

Surrogate Quality Control

Limits:	47-128	55-123	51-158	

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062412AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851917	82	88	82	77
4851918	81	87	81	77
4851919	84	89	83	78
4851920	87	93	86	80
4851921	81	87	80	74
4851922	79	84	77	72
4851923	81	88	86	80
4851924	81	86	79	74
4851925	77	83	75	73
4851926	82	88	80	76
4851927	79	84	76	71
4851928	77	82	90	88
4851929	121*	128*	118	114*
4851930	93	99	89	84
Blank	85	92	84	79
LCS	81	88	81	78
LCSD	81	89	81	79
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062412AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851931	81	86	81	74
4851932	85	92	84	77
4851933	80	86	80	74
4851934	86	92	84	79
Blank	84	90	83	79
LCS	81	88	81	78
LCSD	81	89	81	79
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.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003265 Sample # 4851917-34

Chain 1 of 2

COC # 0134336

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: SECOR Acct. #:
Project Name/#: SUN-PHL PB 843 PWSID #:
Project Manager: C Yetman P.O.#:
Sampler: R. Bower Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) Analyses Requested

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water	Other	Total # of Containers	Fuel Oil 4,5,6 + Used Motor Oil (no lead)									Remarks
843 Perimeter 1	8/23/06	0930							✓									
843 Perimeter 2		0908							✓									
843 Perimeter 3		0901							✓									
843 Perimeter 4		0850							✓									
843 Perimeter 5		0914							✓									
843 Perimeter 6		0920							✓									
843 Line 1		1034							✓									
843 Line 2		1043							✓									
843 Line 3		1048							✓									
843 Line 4		1059							✓									

Preservation Codes

For Lab Use Only
FSC:
SCR#:

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

(6)

Drop Aline + underline on label

(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: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8/25/06	1517
[signature]	8/25/06	1700			
			[signature]	8/25/06	1700

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

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003265 Sample # 4851917-34

COC # 0134337 2 of 2

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: SECOR Acct. #:

Project Name/#: SUN-PHL PB843 PWSID #:

Project Manager: P.O.#:

Sampler: Quote #:

Name of state where samples were collected:

For Lab Use Only
FSC:
SCR#:

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 | Matrix (4) Soil | Water | Other | Total # of Containers | (5) Analyses Requested: Fuel Oil No 4,5,6 | Used Motor Oil (no lead) | Remarks (6)

Sample Identification	Date Collected	Time Collected	Grab	Soil	Water	Other	Total # of Containers	Fuel Oil No 4,5,6	Used Motor Oil (no lead)	Remarks
843 ~~[illegible]~~ Line 5	8/23/06	1706	X	X			2	✓		
843 Line 6	8/23	1115	X	X			2	✓		
843 Line 7	8/23	1218	X	X			2	✓		
843 Line 8	8/23	1225	X	X			2	✓		
843 Line 9	8/23	1232	X	X			2	✓		
~~843 Line 10~~				X			2	✓		
~~843 Line 11~~				X			2	✓		
843 SUB 1	8/23	1130	X	X			2	✓		
843 SUB 2	8/23	1020	X	X			2	✓		
843 SUB 3	8/23	1145	X	X			2	✓		

Ignore A line + underline on label

(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: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8/25/06	1872
[signature]	8/25/06	1780			
			[signature]	8/26/06	1700

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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APPENDIX B

PADEP Aboveground Storage Tank System Closure Report Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

51-19781
Facility I.D.

Philadelphia
Municipality

Philadelphia
County

Date Prepared

Ron Rosendorn
Name of Person Submitting Report
(Please Print)

Sunoco, Inc. (R & M)
Company Name
(If Applicable)

Sr. Environmental Engineer
Title

Closure Method (Check all that apply):

- ☐ AST Removal
- ☒ AST Closure-In-Place
- ☐ AST Change-In-Service

Site Assessment Results (Check all that apply):

- ☒ No Obvious Contamination - Sample Results Meet Standards/Levels
- ☐ No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Owners who are permanently closing aboveground storage tanks may use this form to demonstrate that a storage tank closure was performed in accordance with the "Closure Requirements for Aboveground Storage Tank Systems" document.
PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-19781
2. Facility Name Sunoco, Inc.
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
6. Facility Contact Person Ron Rosendorn
7. Facility Telephone Number (215)
8. Owner Name Sunoco, Inc.
9. Owner Mailing Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
10. Description of Aboveground Storage Tanks (Complete for each tank closed)

DATE OF TANK CLOSURE (Month/Day/Year)		12/28/06	12/28/06	12/28/06	
Tank Registration Number		111A	112A	116A	
Estimated Total Capacity (Gallons)		6346200	6346200	5758200	
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify	Recovered Oil	Crude Oil	Crude Oil	
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☐
	Name of Principal CERCLA Substance				
	AND				
	Chemical Abstract Service (CAS) No.				
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☐	☐	☐	☐
	b. Closure-in-Place	☒	☒	☒	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)		No	No	No	

DATE OF TANK CLOSURE (Month/Day/Year)					
Tank Registration Number					
Estimated Total Capacity (Gallons)					
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	a. **Petroleum** Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify				
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	b. **Hazardous Substance** Name of Principal CERCLA Substance	☐	☐	☐	☐
	AND				
	Chemical Abstract Service (CAS) No.				
	c. **Unknown**	☐	☐	☐	☐
Closure Method (Check Only One)	a. **Removal**	☐	☐	☐	☐
	b. **Closure-in-Place**	☐	☐	☐	☐
	c. **Change-In-Service**	☐	☐	☐	☐
Partial System Closure (Yes or No)					

Yes **N/A**

☒ ☐ 11. Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of tanks:**

The storage tank facility includes over 100 bulk storage tanks involved with the oil refining process. Most of the tanks contain petroleum feedstocks, intermediates, and refined products. The balance of tanks are chemical additives.

☐ ☒ 12. A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.

☐ ☒ 13. Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).

☒ ☐ 14. An amended "Registration/Permitting of Storage Tanks" form was submitted to the DEP, Bureau of Land Recycling and Waste Management, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 11/21/06

☐ ☒ 15. If a reportable release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: _____ Office: _____

Yes N/A

☒ ☐ 16. If tanks were cleaned on-site:

a. Briefly describe the disposition of usable product: Usable product was transferred to another available on-site product tank.

b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
Non-hazardous tank residue/solids were containerized in roll-off dumpsters and transported to a subtitle D non-hazardous landfill (Grows Landfill - Morrisville, PA) Tanks were cleaned 5+ years ago. Archived waste manifests are kept at Iron Mountain records retention facility.

c. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: N/A

(2) Licensed Hazardous Waste Transporter Name and ID Number: N/A - not RCRA hazardous at time of cleaning.

☐ ☒ 17. If tanks were removed from the site for cleaning:

a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning:

b. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):
Tanks shells remain in place. Underground piping and some aboveground piping was sent for steel scrap to Allegheny Recycling, Inc.

☐ ☒ 19. If contaminated soil is excavated:

a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):

b. If contaminated soil is determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

Yes N/A

☐ ☒ 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

☒ ☐ 21. If the tanks were "Closed-in-Place" provide information below:

a. Briefly describe the tank cleaning process: Tanks were flushed with #2 oil and then water washed. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP.

b. If subcontracted, name and address of company that performed the tank cleaning:

Hydrochem, Inc., 309 Salina Road, Sewell, NJ 08080

c. How were tanks marked/labeled with permanent closure date: Paint stencil at manway.

I, Michael G. McKee (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

Signature of Tank Owner

Date

Printed on Recycled Paper

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION II. Tank Handling Information

Facility ID Number 51-19781
Tank Registration ID Number(s) 111A

Yes N/A

1. Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil and debris:

   N/A

2. Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping:

   Pipe internals were cleaned using a high pressure water wash. Underground piping was removed and scrapped. Aboveground piping was blinded and valving was dropped. Piping was in good condition.

3. Briefly describe the condition of the tanks and any problems encountered during tank handling or tank removal activities:

   No problems.

4. Briefly describe the method used to purge the tanks of and monitor for hazardous or explosive vapors:

   Tank was flushed with #2 oil and then water washed.

☒ ☐ 5. If tanks were cleaned on-site:

   a. Briefly describe the tank cleaning process: Tank was flushed with #2 oil and then water washed. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP.

   b. If subcontracted, name and address of company that performed the tank cleaning:

      Hydrochem, 309 Salina Rd, Sewell, NJ 08080

☒ ☐ 6. If tanks were closed-in-place, briefly describe how tanks were rendered inoperative, marked permanently closed with date, vented and secured to prevent unauthorized entry: In addition to item # 2, manways were left open and screened to prevent entry. The permanent closure date was stenciled at the manways.

SECTION II. (continued)

☐ ☒ 7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

I Christopher R Leggett hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed the tank handling activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

Christopher R Leggett
Signature of Certified Installer

11-21-06
Date

[redacted] 5263
Installer Certification Number

385
Company Certification Number

WTK welding
Company Name

1000 Union Landing Road
Street

Riverton, NJ 08077
City/Town, State, Zip

856-764-1210
Phone

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 111A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51-19781

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water N/A feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping underground piping removed, above ground piping closed-in-place approximately 60 feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

E. If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Ryan Bower (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

3.12.07
Date

Field Geologist
Title of Person Performing Site Assessment

SECOR International, Inc.
Name of Company Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM
CLOSURE REPORT FORM

Sample/Analysis Information
(Attachment for Section III.)
Facility ID Number 51-19781

Sample I.D. (See diagram)	Parameter	Analytical Method[1]		Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
see Table 1								

[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: 51 - 19781

County: Philadelphia

Township/Borough: Philadelphia

See FIGURE 1 and FIGURE 2

SECOR

SECOR
INTERNATIONAL
INCORPORATED

January 7, 2008

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-844 (PA Registration #112A)**
Closure-in-Place, Confirmatory Sampling Activities Report
Sunoco, Inc. (R&M) –Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID# 51-19781

Dear Mr. Rosendorn:

This letter summarizes the confirmatory sampling activities that were conducted in the vicinity of aboveground storage tank (AST) PB-844. The project site is located at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Confirmatory sampling activities were conducted for the closure-in-place of AST PB-844. A Pennsylvania Department of Environmental Protection (PADEP) Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on July 21, 2006 by SUNOCO.

Soil Sampling Activities

AST PB-844 is a 150-foot diameter AST that previously contained crude oil. For ASTs with a diameter greater than 90 feet, the PADEP Closure Requirements for Aboveground Storage Tank Systems (Closure Requirements) specifies the collection of soil samples from both the perimeter of the AST and from below the AST is to be determined upon consultation with the DEP regional office. Per conversation with Walter Payne of PADEP the samples were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter. As a result of previous unsuccessful attempts to collect soil samples with a hand auger from below the center of other ASTs, an Alternative Confirmatory Sampling Plan for AST Closures (Alternative Plan) was submitted by SUNOCO to PADEP on March 16, 2006. The Alternative Plan proposed to collect three soil samples from angled drilling in lieu of sampling directly beneath the AST. The angled drilling would take place external to the tank shell and would be directed towards the center of the tank to a vertical depth of at least five feet. The Alternative Plan was approved by Walter Payne of PADEP in an April 5, 2006 letter with the stipulation that the number of soil samples to be collected matched the number

of soil samples specified in the Closure Requirements. To satisfy the Closure Requirements six perimeter soil samples and three angled soil samples were collected from AST PB-844. In addition ten soil samples were collected from the area below the former underground piping at AST PB-844.

A total of six perimeter soil samples (AST-844 Perimeter-1, AST-844 Perimeter-2, AST-844 Perimeter-3, AST-844 Perimeter-4, AST-844 Perimeter-5 and AST-844 Perimeter-6) and three angled soil samples (AST-844 Sub-floor 1, AST-844 Sub-floor 2 and AST-844 Sub 3) were collected using a truck mounted Geoprobe® rig. Soil samples AST-844 Perimeter-1 through AST-844 Perimeter-6 were collected at a depth of approximately three feet below grade (fbg). Soil samples AST-844 Sub-floor 1, AST-844 Sub-floor 2, and AST-844 Sub-floor 3 were collected at a vertical depth of approximately five fbg (the borings were advanced 7 feet at a 45° angle under AST PB-844).

As per the Closure Requirements at least one soil sample must be collected from aboveground or underground piping, biased towards pipe junctures/joints and control valves. A total of ten soil samples were collected from three underground pipelines at AST PB-844. Using a truck mounted Geoprobe® rig, to obtain soil samples from the three underground pipes, soil samples (AST-844 Line 1, AST-844 Line 2, AST-844 Line 3, AST-844 Line 4, AST-844 Line 5, AST-844 Line-6, AST-844 Line 7, AST-844 Line 8, AST-844 Line 9, and AST-844 Line 10) were collected approximately 5.5-6 fbg. Soil sampling locations are depicted on **Figure 2**.

Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (with the exception of lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, cumene and naphthalene by EPA Method 8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP developed MSCs for soils are based on direct contact exposure scenarios and MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential

Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. With the exception of benzene in one sample, no soil samples exceeded for the Used Aquifer Nonresidential Soil to Groundwater MSCs. Benzene was detected above the Used Aquifer Nonresidential Soil to Groundwater MSCs in soil sample AST-844-LINE-10. This sample appears to be isolated since surrounding soil sample results indicate that is benzene was either none detect or detected at very insignificant levels.

Conclusions

Under the 2003 Consent Order & Agreement between PADEP and Sunoco, the Philadelphia facility was divided into 11 Areas of Interest (AOI's) for site characterization and remediation purposes. AST PB-844 is located within AOI 4, the southeast quadrant of the Point Breeze South Yard. The site characterization for AOI 4, titled Site Characterization Report AOI 4, was submitted to PADEP on August 25, 2005. Monitoring Well S-216 immediately downgradient of AST PB-844 demonstrated 290 ppb benzene in groundwater. Monitoring wells S-96, slightly further downgradient, and S-122, on the 26th Street boundary, showed no exceedance for any analyte on the the COC list. Therefore, no remediation is planned in this area, however, S-122 will remain on the perimeter groundwater monitoring list. Sunoco considers this to satisfy the requirements of the Tank Act.

A copy of the PADEP Aboveground Storage Tank System Closure Report Form is included in **Appendix B**.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

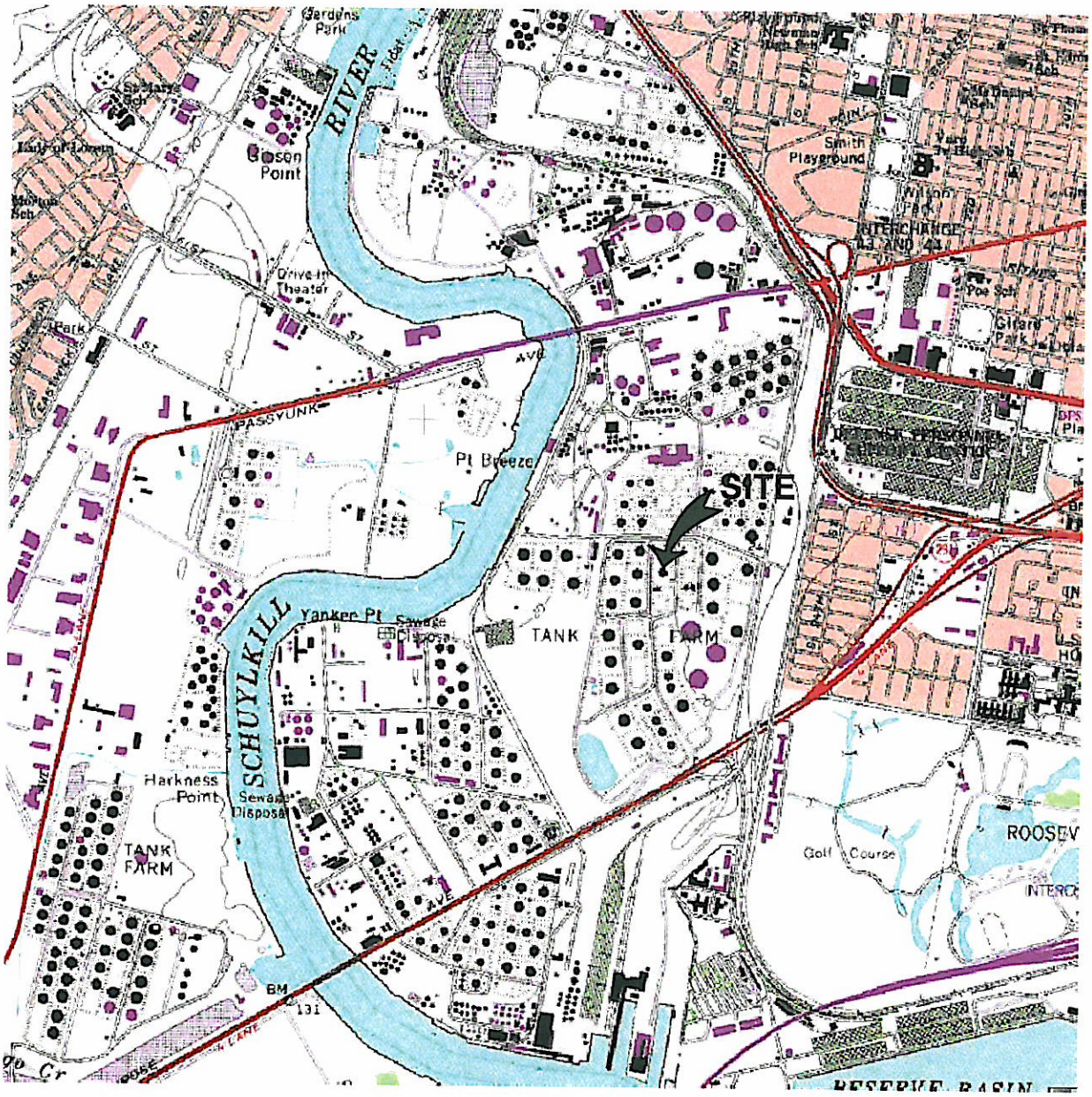
Sincerely,
SECOR International Incorporated

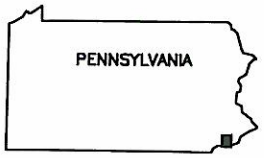
Casey Mundry

Casey Yetman Mundry
Project Manager

cc: Dina Toto (Sunoco)
Project File

FIGURES





QUADRANGLE LOCATION

N

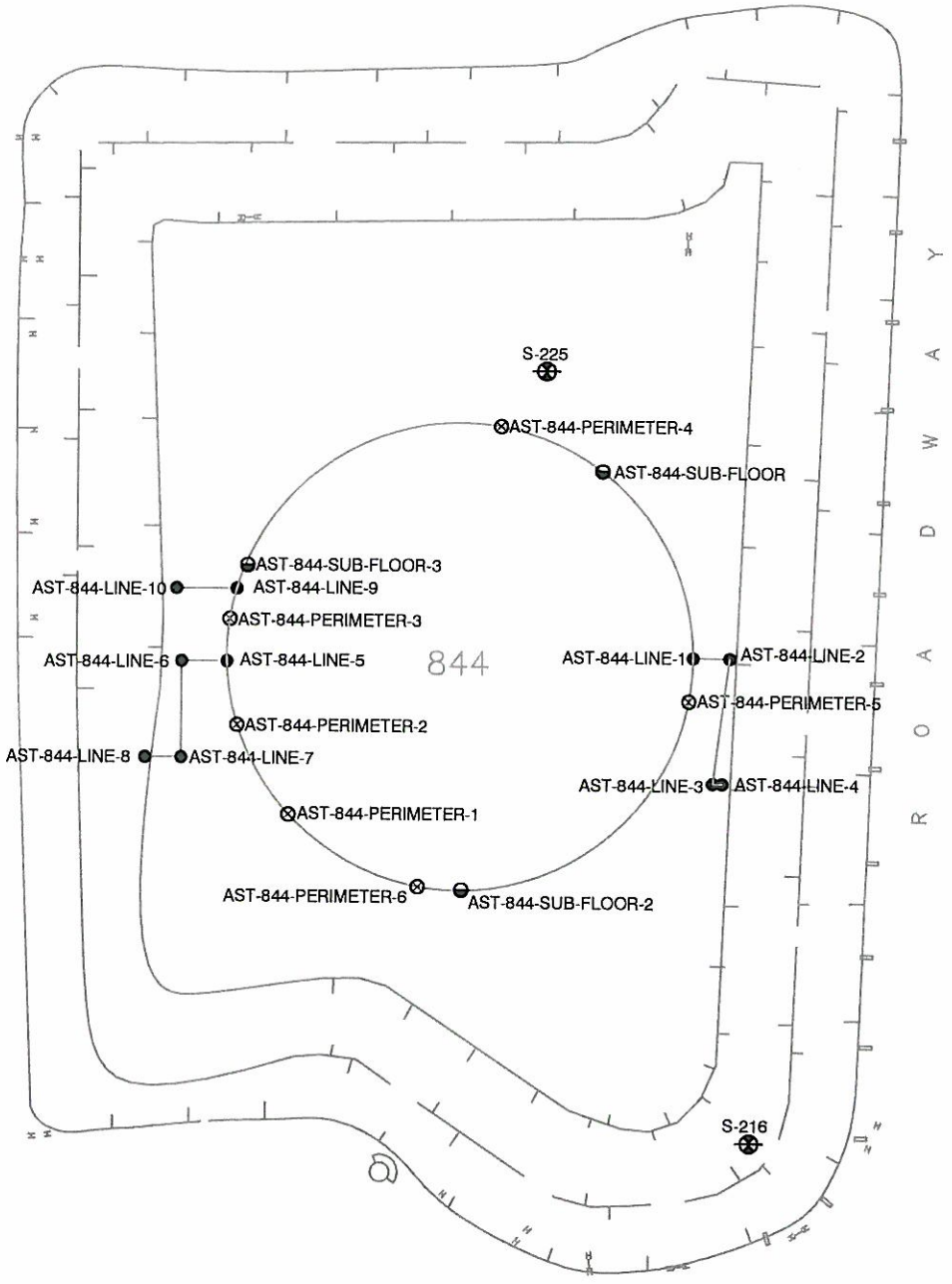
0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:				
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**SITE LOCATION MAP FORMER TANK PB-844 AREA**		FIGURE: **1**
JOB NUMBER:	DRAWN BY: TFB	CHECKED BY: CY	APPROVED BY:	DATE: 01/09/2008



SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR:				FIGURE:
SUNOCO PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**AST-844** **CLOSURE SAMPLING LOCATIONS**		**2**
JOB NUMBER: 62SU.01185.06/0003	**DRAWN BY:** KEF	**CHECKED BY:** CY	**APPROVED BY:**	**DATE:** 01/08/2007

TABLE

Table 1
Summary of Soil Analytical Results
AST PB-844
Sunoco Philadelphia Refinery

Sample Identification	MSCs			AST-844 Perimeter-1	AST-844 Perimeter-2	AST-844 Perimeter-3	AST-844 Perimeter-4	AST-844 Perimeter-5	AST-844 Perimeter-6	AST-844 Line 1	AST-844 Line 2	AST-844 Line 3	AST-844 Line 4
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non residential (2)	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	5.5-6	5.5-6	5.5-6	5.5-6
Sample Collection Date				8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006
VOCs													
Benzene	210,000	240,000	500	ND (26)	ND (29)	ND (26)	380	ND (27)	ND (27)	ND (27)	ND (26)	ND (29)	ND (30)
Toluene	10,000,000	10,000,000	100,000	ND (52)	ND (58)	ND (53)	520	ND (53)	ND (54)	ND (55)	ND (53)	ND (57)	ND (60)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (52)	ND (58)	ND (53)	320	ND (53)	ND (54)	ND (55)	ND (53)	ND (57)	ND (60)
Cumene	10,000,000	10,000,000	1,600,000	ND (52)	ND (58)	ND (53)	ND (61)	73 J	ND (54)	ND (55)	ND (53)	ND (57)	ND (60)
Naphthalene	56,000,000	190,000,000	25,000	ND (52)	ND (58)	ND (53)	130 J	ND (53)	ND (54)	ND (55)	ND (53)	ND (57)	ND (60)
SVOCs													
Anthracene	190,000,000	190,000,000	350,000	170 J	250	150 J	920	480	320	ND (41)	ND (37)	ND (41)	ND (41)
Benzo(a)anthracene	110,000	190,000,000	320,000	570	640	530	2,300	110 J	780	ND (41)	ND (37)	ND (41)	ND (41)
Benzo(a)pyrene	11,000	190,000,000	46,000	680	510	500	1,800	68 J	690	ND (41)	ND (37)	ND (41)	ND (41)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	720	560	530	2,100	93 J	870	ND (41)	ND (37)	ND (41)	ND (41)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	440	320	280	1,000	ND (39)	420	ND (41)	ND (37)	ND (41)	ND (41)
Chrysene	11,000,000	190,000,000	230,000	520	600	490	1,900	120 J	740	ND (41)	ND (37)	ND (41)	ND (41)
Fluorene	110,000,000	190,000,000	3,800,000	75 J	100 J	75 J	420	1,200	150 J	ND (41)	ND (37)	ND (41)	ND (41)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	540	350	320	1,200	48 J	490	ND (41)	ND (37)	ND (41)	ND (41)
Phenanthrene	190,000,000	190,000,000	10,000,000	550	710	600	3,000	3,400	1,000	ND (41)	ND (37)	ND (41)	ND (41)
Pyrene	84,000,000	190,000,000	2,200,000	620	900	660	3,000	380	1,100	ND (41)	ND (37)	ND (41)	ND (41)

Sample Identification	MSCs			AST-844 Line 5	AST-844 Line 6	AST-844 Line 7	AST-844 Line 8	AST-844 Line 9	AST-844 Line 10	AST-844 Sub-floor 1	AST-844 Sub-floor 2	AST-844 Sub-floor 3
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non residential (2)	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6	5-5.5	5-5.5	5-5.5
Sample Collection Date				8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006	8/23/2006
VOCs												
Benzene	210,000	240,000	500	34 J	ND (30)	ND (29)	67 J	35 J	**2,400**	31 J	ND (28)	95 J
Toluene	10,000,000	10,000,000	100,000	ND (58)	ND (61)	ND (58)	ND (54)	ND (54)	ND (190)	ND (52)	ND (56)	78 J
Ethylbenzene	10,000,000	10,000,000	70,000	ND (58)	ND (61)	ND (58)	ND (54)	220 J	8,300	ND (52)	ND (56)	ND (54)
Cumene	10,000,000	10,000,000	1,600,000	ND (58)	ND (61)	ND (58)	ND (54)	340	4,200	ND (52)	ND (56)	ND (54)
Naphthalene	56,000,000	190,000,000	25,000	ND (58)	ND (61)	ND (58)	ND (54)	950	12,000	ND (52)	ND (56)	ND (54)
SVOCs												
Anthracene	190,000,000	190,000,000	350,000	78 J	ND (41)	ND (40)	ND (40)	ND (41)	4,000	140 J	ND (40)	78 J
Benzo(a)anthracene	110,000	190,000,000	320,000	310	ND (41)	57 J	110 J	170 J	540	210	ND (40)	110 J
Benzo(a)pyrene	11,000	190,000,000	46,000	310	ND (41)	54 J	110 J	200	100 J	140 J	ND (40)	89 J
Benzo(b)fluoranthene	110,000	190,000,000	170,000	320	ND (41)	54 J	130 J	190 J	66 J	150 J	ND (40)	97 J
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	170 J	ND (41)	ND (40)	82 J	150 J	ND (36)	73 J	ND (40)	130 J
Chrysene	11,000,000	190,000,000	230,000	270	ND (41)	56 J	120 J	450	560	200	ND (40)	150 J
Fluorene	110,000,000	190,000,000	3,800,000	ND (41)	ND (41)	ND (40)	ND (40)	970	2,200	67 J	ND (40)	ND (39)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	160 J	ND (41)	ND (40)	73 J	140 J	38 J	87 J	ND (40)	88 J
Phenanthrene	190,000,000	190,000,000	10,000,000	230	ND (41)	56 J	76 J	1,900	4,100	520	ND (40)	180 J
Pyrene	84,000,000	190,000,000	2,200,000	290	ND (41)	69 J	140 J	320	430	370	ND (40)	170 J

Notes:
FBG = Feet Below Grade
All concentrations are in ug/kg (micrograms per kilogram)
ND (30) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Laboratory Analytical Report

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:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1003268. Samples arrived at the laboratory on Friday, August 25, 2006.

Client Description	Lancaster Labs Number
844 Perimeter 1 Grab Soil Sample	4851938
844 Perimeter 2 Grab Soil Sample	4851939
844 Perimeter 3 Grab Soil Sample	4851940
844 Perimeter 4 Grab Soil Sample	4851941
844 Perimeter 5 Grab Soil Sample	4851942
844 Perimeter 6 Grab Soil Sample	4851943
844 Line 1 Grab Soil Sample	4851944
844 Line 2 Grab Soil Sample	4851945
844 Line 3 Grab Soil Sample	4851946
844 Line 4 Grab Soil Sample	4851947
844 Line 5 Grab Soil Sample	4851948
844 Line 6 Grab Soil Sample	4851949
844 Line 7 Grab Soil Sample	4851950
844 Line 8 Grab Soil Sample	4851951
844 Line 9 Grab Soil Sample	4851952
844 Line 10 Grab Soil Sample	4851953
844 Sub 1 Grab Soil Sample	4851954
844 Sub 2 Grab Soil Sample	4851955
844 Sub 3 Grab Soil Sample	4851956

1 COPY TO SECOR International, Inc Attn: Casey Yetman

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

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Rachel R. Cochis

Rachel R. Cochis
Group Leader

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. SW 4851938

844 Perimeter 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:44 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

844P1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	620.		38.	ug/kg	1
03768	Fluorene	86-73-7	75.	J	38.	ug/kg	1
03775	Phenanthrene	85-01-8	550.		38.	ug/kg	1
03776	Anthracene	120-12-7	170.	J	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	570.		38.	ug/kg	1
03782	Chrysene	218-01-9	520.		38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	720.		38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	680.		38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	540.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	440.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		26.	ug/kg	45.45
05466	Toluene	108-88-3	N.D.		52.	ug/kg	45.45
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	45.45
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	45.45
05498	Naphthalene	91-20-3	N.D.		52.	ug/kg	45.45

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 13:35	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 16:43	Robin C Runkle	45.45

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. SW 4851938

844 Perimeter 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:44 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

Account Number: 11183

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

844P1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:35	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851939

844 Perimeter 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:39 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

844P2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	900.		39.	ug/kg	1
03768	Fluorene	86-73-7	100.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	710.		39.	ug/kg	1
03776	Anthracene	120-12-7	250.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	640.		39.	ug/kg	1
03782	Chrysene	218-01-9	600.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	560.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	510.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	350.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	320.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	49.7
05466	Toluene	108-88-3	N.D.		58.	ug/kg	49.7
05474	Ethylbenzene	100-41-4	N.D.		58.	ug/kg	49.7
05479	Isopropylbenzene	98-82-8	N.D.		58.	ug/kg	49.7
05498	Naphthalene	91-20-3	N.D.		58.	ug/kg	49.7

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	09/01/2006 13:57	Timothy J Trees	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 17:06	Robin C Runkle	49.7

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Analysis Report

Lancaster Laboratories Sample No. SW 4851939

844 Perimeter 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:39 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

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844P2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:36	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 14:05	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851940

844 Perimeter 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:13 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

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Exton PA 19341

844P3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	660.		39.	ug/kg	1
03768	Fluorene	86-73-7	75.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	600.		39.	ug/kg	1
03776	Anthracene	120-12-7	150.	J	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	530.		39.	ug/kg	1
03782	Chrysene	218-01-9	490.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	530.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	500.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	320.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	280.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		26.	ug/kg	44.8
05466	Toluene	108-88-3	N.D.		53.	ug/kg	44.8
05474	Ethylbenzene	100-41-4	N.D.		53.	ug/kg	44.8
05479	Isopropylbenzene	98-82-8	N.D.		53.	ug/kg	44.8
05498	Naphthalene	91-20-3	N.D.		53.	ug/kg	44.8

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 08:19	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 17:29	Robin C Runkle	44.8

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Analysis Report

Lancaster Laboratories Sample No. SW 4851940

844 Perimeter 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:13 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

Account Number: 11183

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844P3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:37	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851941

844 Perimeter 4 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:18 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

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844P4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	21.2		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	3,000.		42.	ug/kg	1
03768	Fluorene	86-73-7	420.		42.	ug/kg	1
03775	Phenanthrene	85-01-8	3,000.		42.	ug/kg	1
03776	Anthracene	120-12-7	920.		42.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	2,300.		42.	ug/kg	1
03782	Chrysene	218-01-9	1,900.		42.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	2,100.		42.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,800.		42.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,200.		42.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,000.		42.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	380.		31.	ug/kg	48.26
05466	Toluene	108-88-3	520.		61.	ug/kg	48.26
05474	Ethylbenzene	100-41-4	320.		61.	ug/kg	48.26
05479	Isopropylbenzene	98-82-8	N.D.		61.	ug/kg	48.26
05498	Naphthalene	91-20-3	130.	J	61.	ug/kg	48.26

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 09:26	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 17:51	Robin C Runkle	48.26

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Analysis Report

Lancaster Laboratories Sample No. SW 4851941

844 Perimeter 4 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:18 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

Account Number: 11183

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844P4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:38	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851942

844 Perimeter 5 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:03 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

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844P5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.6		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	380.		39.	ug/kg	1
03768	Fluorene	86-73-7	1,200.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	3,400.		39.	ug/kg	1
03776	Anthracene	120-12-7	480.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	110.	J	39.	ug/kg	1
03782	Chrysene	218-01-9	120.	J	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	93.	J	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	68.	J	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	48.	J	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		27.	ug/kg	45.13
05466	Toluene	108-88-3	N.D.		53.	ug/kg	45.13
05474	Ethylbenzene	100-41-4	N.D.		53.	ug/kg	45.13
05479	Isopropylbenzene	98-82-8	73.	J	53.	ug/kg	45.13
05498	Naphthalene	91-20-3	N.D.		53.	ug/kg	45.13

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/30/2006 20:46	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 18:14	Robin C Runkle	45.13

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Analysis Report

Lancaster Laboratories Sample No. SW 4851942

844 Perimeter 5 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:03 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:03
Discard: 09/26/2006

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844P5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:39	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851943

844 Perimeter 6 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:48 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844P6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	12.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,100.		38.	ug/kg	1
03768	Fluorene	86-73-7	150.	J	38.	ug/kg	1
03775	Phenanthrene	85-01-8	1,000.		38.	ug/kg	1
03776	Anthracene	120-12-7	320.		38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	780.		38.	ug/kg	1
03782	Chrysene	218-01-9	740.		38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	870.		38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	690.		38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	490.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	420.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		27.	ug/kg	46.9
05466	Toluene	108-88-3	N.D.		54.	ug/kg	46.9
05474	Ethylbenzene	100-41-4	N.D.		54.	ug/kg	46.9
05479	Isopropylbenzene	98-82-8	N.D.		54.	ug/kg	46.9
05498	Naphthalene	91-20-3	N.D.		54.	ug/kg	46.9

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:20	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 10:11	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 18:37	Robin C Runkle	46.9

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Analysis Report

Lancaster Laboratories Sample No. SW 4851943

844 Perimeter 6 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:48 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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844P6

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:40	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851944

844 Line 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:51 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.7	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	41.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	41.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	41.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	41.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	27.	ug/kg	45.13
05466	Toluene	108-88-3	N.D.	55.	ug/kg	45.13
05474	Ethylbenzene	100-41-4	N.D.	55.	ug/kg	45.13
05479	Isopropylbenzene	98-82-8	N.D.	55.	ug/kg	45.13
05498	Naphthalene	91-20-3	N.D.	55.	ug/kg	45.13

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/30/2006 21:08	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 18:59	Robin C Runkle	45.13

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Analysis Report

Lancaster Laboratories Sample No. SW 4851944

844 Line 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:51 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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844L1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:41	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851945

844 Line 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:00 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	9.8	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	37.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	37.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	37.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	37.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	37.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	37.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	37.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	37.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	37.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	37.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	26.	ug/kg	47.76
05466	Toluene	108-88-3	N.D.	53.	ug/kg	47.76
05474	Ethylbenzene	100-41-4	N.D.	53.	ug/kg	47.76
05479	Isopropylbenzene	98-82-8	N.D.	53.	ug/kg	47.76
05498	Naphthalene	91-20-3	N.D.	53.	ug/kg	47.76

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 10:56	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 19:22	Robin C Runkle	47.76

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Analysis Report

Lancaster Laboratories Sample No. SW 4851945

844 Line 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:00 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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Exton PA 19341

844L2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:42	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851946

844 Line 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:09 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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Exton PA 19341

844L3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	18.0	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	41.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	41.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	41.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	41.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	29.	ug/kg	46.9
05466	Toluene	108-88-3	N.D.	57.	ug/kg	46.9
05474	Ethylbenzene	100-41-4	N.D.	57.	ug/kg	46.9
05479	Isopropylbenzene	98-82-8	N.D.	57.	ug/kg	46.9
05498	Naphthalene	91-20-3	N.D.	57.	ug/kg	46.9

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 11:18	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 18:29	Robin C Runkle	46.9

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Analysis Report

Lancaster Laboratories Sample No. SW 4851946

844 Line 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:09 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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844L3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:43	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851947

844 Line 4 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:22 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L4

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	19.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	41.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	41.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	41.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	41.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	30.	ug/kg	48.22
05466	Toluene	108-88-3	N.D.	60.	ug/kg	48.22
05474	Ethylbenzene	100-41-4	N.D.	60.	ug/kg	48.22
05479	Isopropylbenzene	98-82-8	N.D.	60.	ug/kg	48.22
05498	Naphthalene	91-20-3	N.D.	60.	ug/kg	48.22

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 11:41	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 19:44	Robin C Runkle	48.22

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Analysis Report

Lancaster Laboratories Sample No. SW 4851947

844 Line 4 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:22 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:44	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851948

844 Line 5 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:23 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	18.6		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	290.		41.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		41.	ug/kg	1
03775	Phenanthrene	85-01-8	230.		41.	ug/kg	1
03776	Anthracene	120-12-7	78.	J	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	310.		41.	ug/kg	1
03782	Chrysene	218-01-9	270.		41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	320.		41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	310.		41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	160.	J	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	170.	J	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	34.	J	29.	ug/kg	47.04
05466	Toluene	108-88-3	N.D.		58.	ug/kg	47.04
05474	Ethylbenzene	100-41-4	N.D.		58.	ug/kg	47.04
05479	Isopropylbenzene	98-82-8	N.D.		58.	ug/kg	47.04
05498	Naphthalene	91-20-3	N.D.		58.	ug/kg	47.04

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 12:03	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 20:07	Robin C Runkle	47.04

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Analysis Report

Lancaster Laboratories Sample No. SW 4851948

844 Line 5 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:23 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:45	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851949

844 Line 6 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:17 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L6

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	19.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	41.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	41.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	41.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	41.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	30.	ug/kg	49.16
05466	Toluene	108-88-3	N.D.	61.	ug/kg	49.16
05474	Ethylbenzene	100-41-4	N.D.	61.	ug/kg	49.16
05479	Isopropylbenzene	98-82-8	N.D.	61.	ug/kg	49.16
05498	Naphthalene	91-20-3	N.D.	61.	ug/kg	49.16

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 12:26	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 20:30	Robin C Runkle	49.16

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Analysis Report

Lancaster Laboratories Sample No. SW 4851949

844 Line 6 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:17 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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Exton PA 19341

844L6

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:46	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/27/2006 14:00	Maryan G Attalla	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851950

844 Line 7 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:34 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	69.	J	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	56.	J	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	57.	J	40.	ug/kg	1
03782	Chrysene	218-01-9	56.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	54.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	54.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	48.59
05466	Toluene	108-88-3	N.D.		58.	ug/kg	48.59
05474	Ethylbenzene	100-41-4	N.D.		58.	ug/kg	48.59
05479	Isopropylbenzene	98-82-8	N.D.		58.	ug/kg	48.59
05498	Naphthalene	91-20-3	N.D.		58.	ug/kg	48.59

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/29/2006 17:25	Ryan P Byrne	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 20:52	Robin C Runkle	48.59

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Analysis Report

Lancaster Laboratories Sample No. SW 4851950

844 Line 7 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:34 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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Exton PA 19341

844L7

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:47	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851951

844 Line 8 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:29 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L8

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	140.	J	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	76.	J	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	110.	J	40.	ug/kg	1
03782	Chrysene	218-01-9	120.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	130.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	110.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	73.	J	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	82.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	67.	J	27.	ug/kg	44.96
05466	Toluene	108-88-3	N.D.		54.	ug/kg	44.96
05474	Ethylbenzene	100-41-4	N.D.		54.	ug/kg	44.96
05479	Isopropylbenzene	98-82-8	N.D.		54.	ug/kg	44.96
05498	Naphthalene	91-20-3	N.D.		54.	ug/kg	44.96

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 03:30	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 21:15	Robin C Runkle	44.96

Lancaster Laboratories Sample No. SW 4851951

844 Line 8 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:29 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

SECOR International, Inc
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844L8

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:48	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851952

844 Line 9 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844L9

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	18.1		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.		41.	ug/kg	1
03768	Fluorene	86-73-7	970.		41.	ug/kg	1
03775	Phenanthrene	85-01-8	1,900.		41.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		41.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	170.	J	41.	ug/kg	1
03782	Chrysene	218-01-9	450.		41.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	190.	J	41.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	200.		41.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	140.	J	41.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	150.	J	41.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	35.	J	27.	ug/kg	43.9
05466	Toluene	108-88-3	N.D.		54.	ug/kg	43.9
05474	Ethylbenzene	100-41-4	220.	J	54.	ug/kg	43.9
05479	Isopropylbenzene	98-82-8	340.		54.	ug/kg	43.9
05498	Naphthalene	91-20-3	950.		54.	ug/kg	43.9

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 03:53	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/30/2006 21:38	Robin C Runkle	43.9

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Analysis Report

Lancaster Laboratories Sample No. SW 4851952

844 Line 9 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 13:10 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

844L9

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:49	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851953

844 Line 10 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 12:55 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

84410

Account Number: 11183

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Suite 200
102 Pickering Way
Exton PA 19341

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	7.1		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	430.		36.	ug/kg	1
03768	Fluorene	86-73-7	2,200.		36.	ug/kg	1
03775	Phenanthrene	85-01-8	4,100.		36.	ug/kg	1
03776	Anthracene	120-12-7	4,000.		36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	540.		36.	ug/kg	1
03782	Chrysene	218-01-9	560.		36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	66.	J	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	100.	J	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	38.	J	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	2,400.		96.	ug/kg	178.41
05466	Toluene	108-88-3	N.D.		190.	ug/kg	178.41
05474	Ethylbenzene	100-41-4	8,300.		190.	ug/kg	178.41
05479	Isopropylbenzene	98-82-8	4,200.		190.	ug/kg	178.41
05498	Naphthalene	91-20-3	12,000.		190.	ug/kg	178.41

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:15	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/31/2006 15:24	Angela D Sneeringer	178.41

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Analysis Report

Lancaster Laboratories Sample No. SW 4851953

844 Line 10 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 12:55 by RB

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

Account Number: 11183

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84410

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 16:50	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851954

844 Sub 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844S1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	370.		40.	ug/kg	1
03768	Fluorene	86-73-7	67.	J	40.	ug/kg	1
03775	Phenanthrene	85-01-8	520.		40.	ug/kg	1
03776	Anthracene	120-12-7	140.	J	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	210.		40.	ug/kg	1
03782	Chrysene	218-01-9	200.		40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	150.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	140.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	87.	J	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	73.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	31.	J	26.	ug/kg	44.01
05466	Toluene	108-88-3	N.D.		52.	ug/kg	44.01
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	44.01
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	44.01
05498	Naphthalene	91-20-3	N.D.		52.	ug/kg	44.01

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:37	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	08/31/2006 16:09	Angela D Sneeringer	44.01

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Analysis Report

Lancaster Laboratories Sample No. SW 4851954

844 Sub 1 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 15:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844S1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:15	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851955

844 Sub 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

844S2

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CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.1	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	N.D.	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	40.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	28.	ug/kg	46.43
05466	Toluene	108-88-3	N.D.	56.	ug/kg	46.43
05474	Ethylbenzene	100-41-4	N.D.	56.	ug/kg	46.43
05479	Isopropylbenzene	98-82-8	N.D.	56.	ug/kg	46.43
05498	Naphthalene	91-20-3	N.D.	56.	ug/kg	46.43

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 05:00	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 03:19	Seth J Good	46.43

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Analysis Report

Lancaster Laboratories Sample No. SW 4851955

844 Sub 2 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:20 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844S2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:16	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851956

844 Sub 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844S3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	170.	J	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	180.	J	39.	ug/kg	1
03776	Anthracene	120-12-7	78.	J	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	110.	J	39.	ug/kg	1
03782	Chrysene	218-01-9	150.	J	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	97.	J	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	89.	J	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	88.	J	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	130.	J	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	95.	J	27.	ug/kg	45.33
05466	Toluene	108-88-3	78.	J	54.	ug/kg	45.33
05474	Ethylbenzene	100-41-4	N.D.		54.	ug/kg	45.33
05479	Isopropylbenzene	98-82-8	N.D.		54.	ug/kg	45.33
05498	Naphthalene	91-20-3	N.D.		54.	ug/kg	45.33

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 05:22	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 03:42	Seth J Good	45.33

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Analysis Report

Lancaster Laboratories Sample No. SW 4851956

844 Sub 3 Grab Soil Sample

SUN PHL PB 844
Collected:08/23/2006 14:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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844S3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:17	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/11/06 at 11:04 AM

Group Number: 1003268

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06238SLC026	Sample number(s): 4851940-4851949							
Pyrene	N.D.	33.	ug/kg	102		67-116		
Fluorene	N.D.	33.	ug/kg	96		66-115		
Phenanthrene	N.D.	33.	ug/kg	99		70-107		
Anthracene	N.D.	33.	ug/kg	96		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	95		73-111		
Chrysene	N.D.	33.	ug/kg	92		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	82		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	85		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	75		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	79		66-120		
Batch number: 06238SLD026	Sample number(s): 4851950-4851956							
Pyrene	N.D.	33.	ug/kg	95		67-116		
Fluorene	N.D.	33.	ug/kg	98		66-115		
Phenanthrene	N.D.	33.	ug/kg	97		70-107		
Anthracene	N.D.	33.	ug/kg	95		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	92		73-111		
Chrysene	N.D.	33.	ug/kg	92		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	76		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	90		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	86		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	88		66-120		
Batch number: 06238SLE026	Sample number(s): 4851938-4851939							
Pyrene	N.D.	33.	ug/kg	103		67-116		
Fluorene	N.D.	33.	ug/kg	96		66-115		
Phenanthrene	N.D.	33.	ug/kg	99		70-107		
Anthracene	N.D.	33.	ug/kg	97		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	97		73-111		
Chrysene	N.D.	33.	ug/kg	95		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	81		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	89		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	98		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	87		66-120		
Batch number: 06241820003B	Sample number(s): 4851938-4851943							
Moisture				100		99-101		
Batch number: 06241820004A	Sample number(s): 4851944-4851953							
Moisture				100		99-101		
Batch number: 06241820004B	Sample number(s): 4851954-4851956							
Moisture				100		99-101		
Batch number: Q062442AB	Sample number(s): 4851955-4851956							
Benzene	N.D.	25.	ug/kg	98	95	77-119	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.

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/11/06 at 11:04 AM

Group Number: 1003268

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Toluene	N.D.	50.	ug/kg	96	94	81-116	2	30
Ethylbenzene	N.D.	50.	ug/kg	94	92	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	89	89	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	74	67	52-121	9	30
Batch number: R062412AB	Sample number(s): 4851938							
Benzene	N.D.	25.	ug/kg	96	98	77-119	2	30
Toluene	N.D.	50.	ug/kg	96	99	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	93	95	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	87	88	79-117	2	30
Naphthalene	N.D.	50.	ug/kg	78	83	52-121	6	30
Batch number: R062421AA	Sample number(s): 4851939-4851945,4851947-4851952							
Benzene	N.D.	25.	ug/kg	95	98	77-119	3	30
Toluene	N.D.	50.	ug/kg	96	98	81-116	2	30
Ethylbenzene	N.D.	50.	ug/kg	94	96	82-115	3	30
Isopropylbenzene	N.D.	50.	ug/kg	87	89	79-117	2	30
Naphthalene	N.D.	50.	ug/kg	76	82	52-121	8	30
Batch number: R062431AA	Sample number(s): 4851953-4851954							
Benzene	N.D.	25.	ug/kg	93	94	77-119	1	30
Toluene	N.D.	50.	ug/kg	93	96	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	92	94	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	86	88	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	72	75	52-121	4	30
Batch number: R062431AB	Sample number(s): 4851946							
Benzene	N.D.	25.	ug/kg	93	94	77-119	1	30
Toluene	N.D.	50.	ug/kg	93	96	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	92	94	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	86	88	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	72	75	52-121	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: 06238SLC026	Sample number(s): 4851940-4851949 UNSPK: 4851940								
Pyrene	96	92	28-151	4	30				
Fluorene	91	92	47-126	2	30				
Phenanthrene	91	89	35-144	2	30				
Anthracene	96	96	38-142	0	30				
Benzo(a)anthracene	97	94	41-136	2	30				
Chrysene	91	88	40-135	2	30				
Benzo(b)fluoranthene	73	73	29-151	1	30				
Benzo(a)pyrene	83	81	37-144	2	30				
Indeno(1,2,3-cd)pyrene	77	80	39-141	3	30				
Benzo(g,h,i)perylene	79	79	33-145	0	30				
Batch number: 06238SLD026	Sample number(s): 4851950-4851956 UNSPK: 4851950								

*- 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.

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/11/06 at 11:04 AM

Group Number: 1003268

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
Pyrene	93	105	28-151	11	30				
Fluorene	97	103	47-126	6	30				
Phenanthrene	98	112	35-144	13	30				
Anthracene	99	102	38-142	3	30				
Benzo(a)anthracene	93	102	41-136	9	30				
Chrysene	91	100	40-135	9	30				
Benzo(b)fluoranthene	84	84	29-151	0	30				
Benzo(a)pyrene	93	99	37-144	6	30				
Indeno(1,2,3-cd)pyrene	88	94	39-141	6	30				
Benzo(g,h,i)perylene	90	95	33-145	5	30				
Batch number: 06238SLE026	Sample number(s): 4851938-4851939 UNSPK: P851917								
Pyrene	103	102	28-151	1	30				
Fluorene	97	94	47-126	4	30				
Phenanthrene	100	97	35-144	3	30				
Anthracene	97	96	38-142	1	30				
Benzo(a)anthracene	99	96	41-136	3	30				
Chrysene	94	93	40-135	1	30				
Benzo(b)fluoranthene	78	76	29-151	3	30				
Benzo(a)pyrene	87	83	37-144	5	30				
Indeno(1,2,3-cd)pyrene	96	91	39-141	5	30				
Benzo(g,h,i)perylene	85	81	33-145	5	30				
Batch number: 06241820003B	Sample number(s): 4851938-4851943 BKG: P852385								
Moisture						12.3	12.8	4	15
Batch number: 06241820004A	Sample number(s): 4851944-4851953 BKG: 4851949								
Moisture						19.3	18.8	2	15
Batch number: 06241820004B	Sample number(s): 4851954-4851956 BKG: P852201								
Moisture						3.2	3.4	6	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: 06238SLC026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851940	97	99	113
4851941	95	96	108
4851942	94	81	105
4851943	95	97	114
4851944	92	91	119
4851945	101	99	123
4851946	89	90	109
4851947	92	91	107
4851948	95	98	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.

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/11/06 at 11:04 AM

Group Number: 1003268

Surrogate Quality Control

4851949	90	94	110
Blank	94	91	108
LCS	97	97	118
MS	95	97	112
MSD	102	102	114
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06238SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851950	82	92	106
4851951	89	92	105
4851952	93	81	95
4851953	126	100	125
4851954	88	91	97
4851955	67	70	80
4851956	84	87	99
Blank	87	97	108
LCS	87	95	103
MS	84	95	99
MSD	88	99	105
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06238SLE026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851938	97	96	100
4851939	96	97	102
Blank	97	95	97
LCS	95	91	107
MS	95	94	106
MSD	90	88	102
Limits:	47-128	55-123	51-158

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q062442AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851955	90	85	76	74
4851956	91	88	80	76
Blank	100	98	86	81
LCS	100	96	92	87
LCSD	97	94	91	86
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062412AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851938	87	93	85	81
Blank	84	90	83	79
LCS	81	88	81	78

*- 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.

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 09/11/06 at 11:04 AM

Group Number: 1003268

Surrogate Quality Control

LCSD	81	89	81	79
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062421AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851939	88	95	85	82
4851940	78	82	76	73
4851941	85	92	83	81
4851942	85	91	82	84
4851943	79	84	78	75
4851944	88	92	85	81
4851945	90	96	90	88
4851947	79	86	74	73
4851948	80	85	77	72
4851949	83	88	80	78
4851950	86	91	85	80
4851951	75	80	74	72
4851952	76	81	108	99
Blank	84	90	83	79
LCS	80	87	81	78
LCSD	80	84	81	78
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062431AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851953	78	85	220*	172*
4851954	83	89	82	80
Blank	84	90	84	77
LCS	80	86	80	78
LCSD	88	95	90	86
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062431AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851946	78	82	76	71
Blank	100	107	98	89
LCS	80	86	80	78
LCSD	88	95	90	86
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.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003268 Sample # 4851938-56

Chain 1 of 2

COC # 0133046

Please print. Instructions on reverse side correspond with circled numbers.

(1)

Client: SECOR Acct. #:

Project Name/#: SUN-PHL PB 844 PWSID #:

Project Manager: C. Yetman P.O.#:

Sampler: R. Bower Quote #:

Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR#:

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

(2) (3) (4) (5) (6)

Sample Description	Date	Time	Grab	Comp	Fuel oil No. 4,5,6 + Used Motor Oil (No Lead)	Remarks
844 Perimeter 1	8/23/06	~~0930~~	X	X	2 ✓	
844 Perimeter 2	8/23	1339	X	X	2 ✓	temp 1.5-4.5°C
844 Perimeter 3	8/23	1313	X	X	2 ✓	
844 Perimeter 4	8/23	1518	X	X	2 ✓	
844 Perimeter 5	8/23	1403	X	X	2 ✓	
844 Perimeter 6	8/23	1348	X	X	2 ✓	
844 Line 1	8/23	1451	X	X	2 ✓	
844 Line 2	8/23	1500	X	X	2 ✓	
844 Line 3	8/23	1409	X	X	2 ✓	
844 Line 4	8/23	1522	X	X	2 ✓	

(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: ~~C. Yetman~~ cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8/25/06	1500
[signature]	8/25/06	1700			
			[signature]	8/25/06	1700

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

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11188 Group# 1003268 Sample # 4851928-56

COC # 0133047 Chain 2 of 2

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: SELOR Acct. #:

Project Name/#: SUN-PHL PB 844 PWSID #:

Project Manager: P.O.#:

Sampler: Quote #:

Name of state where samples were collected: PA

(4) (5) Preservation Codes

For Lab Use Only
FSC:
SCR#:

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

(6)

| (2) | | (3) | | |

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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APPENDIX B

PADEP Aboveground Storage Tank System Closure Report Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

51-19781
Facility I.D.

Philadelphia
Municipality

Philadelphia
County

Date Prepared

Ron Rosendorn
Name of Person Submitting Report
(Please Print)

Sunoco, Inc. (R & M)
Company Name
(If Applicable)

Sr. Environmental Engineer
Title

Closure Method (Check all that apply):

- ☐ AST Removal
- ☒ AST Closure-In-Place
- ☐ AST Change-In-Service

Site Assessment Results (Check all that apply):

- ☒ No Obvious Contamination - Sample Results Meet Standards/Levels
- ☐ No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Owners who are permanently closing aboveground storage tanks may use this form to demonstrate that a storage tank closure was performed in accordance with the "Closure Requirements for Aboveground Storage Tank Systems" document.
PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-19781
2. Facility Name Sunoco, Inc.
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
6. Facility Contact Person Ron Rosendorn
7. Facility Telephone Number (215)
8. Owner Name Sunoco, Inc.
9. Owner Mailing Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
10. Description of Aboveground Storage Tanks (Complete for each tank closed)

DATE OF TANK CLOSURE (Month/Day/Year)		12/28/06	12/28/06	12/28/06	
Tank Registration Number		111A	112A	116A	
Estimated Total Capacity (Gallons)		6346200	6346200	5758200	
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify	Recovered Oil	Crude Oil	Crude Oil	
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☐
	Name of Principal CERCLA Substance				
	AND				
	Chemical Abstract Service (CAS) No.				
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☐	☐	☐	☐
	b. Closure-in-Place	☒	☒	☒	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)		No	No	No	

DATE OF TANK CLOSURE (Month/Day/Year)					
Tank Registration Number					
Estimated Total Capacity (Gallons)					
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify	_____	_____	_____	_____
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☐
	Name of Principal CERCLA Substance	_____	_____	_____	_____
	AND				
	Chemical Abstract Service (CAS) No.	_____	_____	_____	_____
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☐	☐	☐	☐
	b. Closure-in-Place	☐	☐	☐	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)					

Yes	N/A		
☒	☐	11.	Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of tanks:**

The storage tank facility includes over 100 bulk storage tanks involved with the oil refining process. Most of the tanks contain petroleum feedstocks, intermediates, and refined products. The balance of tanks are chemical additives.

☐	☒	12.	A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.
☐	☒	13.	Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).
☒	☐	14.	An amended "Registration/Permitting of Storage Tanks" form was submitted to the DEP, Bureau of Land Recycling and Waste Management, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 11/21/06

☐	☒	15.	If a reportable release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: _____ Office: _____

Yes N/A

☒ ☐ 16. If tanks were cleaned on-site:

a. Briefly describe the disposition of usable product: Usable product was transferred to another available on-site product tank.

b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
Non-hazardous tank residue/solids were containerized in roll-off dumpsters and transported to a subtitle D non-hazardous landfill (Grows Landfill - Morrisville, PA) Tanks were cleaned 5+ years ago. Archived waste manifests are kept at Iron Mountain records retention facility.

c. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: N/A

(2) Licensed Hazardous Waste Transporter Name and ID Number: N/A - not RCRA hazardous at time of cleaning.

☐ ☒ 17. If tanks were removed from the site for cleaning:

a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning:

b. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):
Tanks shells remain in place. Underground piping and some aboveground piping was sent for steel scrap to Allegheny Recycling, Inc.

☐ ☒ 19. If contaminated soil is excavated:

a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):

b. If contaminated soil is determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

Yes N/A

☐ ☒ 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

☒ ☐ 21. If the tanks were "Closed-in-Place" provide information below:

a. Briefly describe the tank cleaning process: Tanks were flushed with #2 oil and then water washed.. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP.

b. If subcontracted, name and address of company that performed the tank cleaning:

Hydrochem, Inc., 309 Salina Road, Sewell, NJ 08080

c. How were tanks marked/labeled with permanent closure date: Paint stencil at manway.

I, Michael G. McKee, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating
(Print Name)
to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

Signature of Tank Owner

Date

Printed on Recycled Paper

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION II. Tank Handling Information

Facility ID Number 51-19781
Tank Registration ID Number(s) 112A

Yes	N/A		
		1.	Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil and debris: N/A
		2.	Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping: Pipe internals were cleaned using a high pressure water wash. Underground piping was removed and scrapped. Aboveground piping was blinded and valving was dropped. Piping was in good condition.
		3.	Briefly describe the condition of the tanks and any problems encountered during tank handling or tank removal activities: No problems.
		4.	Briefly describe the method used to purge the tanks of and monitor for hazardous or explosive vapors: Tank was flushed with #2 oil and then water washed.
☒	☐	5.	If tanks were cleaned on-site: a. Briefly describe the tank cleaning process: Tank was flushed with #2 oil and then water washed. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP. b. If subcontracted, name and address of company that performed the tank cleaning: Hydrochem, 309 Salina Rd, Sewell, NJ 08080
☒	☐	6.	If tanks were closed-in-place, briefly describe how tanks were rendered inoperative, marked permanently closed with date, vented and secured to prevent unauthorized entry: In addition to item # 2, manways were left open and screened to prevent entry. The permanent closure date was stenciled at the manways.

SECTION II. (continued)

☐ ☒ 7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

I, Christopher Rhiegy, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed the tank handling activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

Christopher R Luggy
Signature of Certified Installer

11-21-06
Date

5263
Installer Certification Number

385
Company Certification Number

W+K welding
Company Name

1000 Union Landing Road
Street

Riverton, NJ 08077
City/Town, State, Zip

856-764-1210
Phone

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 112A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51-19781

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water N/A feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

E. If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Ryan Bower (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

12/21/07
Date

Field Geologist
Title of Person Performing Site Assessment

SECOR International, Inc.
Name of Company Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM
CLOSURE REPORT FORM

Sample/Analysis Information
(Attachment for Section III.)
Facility ID Number 51-19781

Sample I.D. (See diagram)	Parameter	Analytical Method[1]		Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
see Table 1								

[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

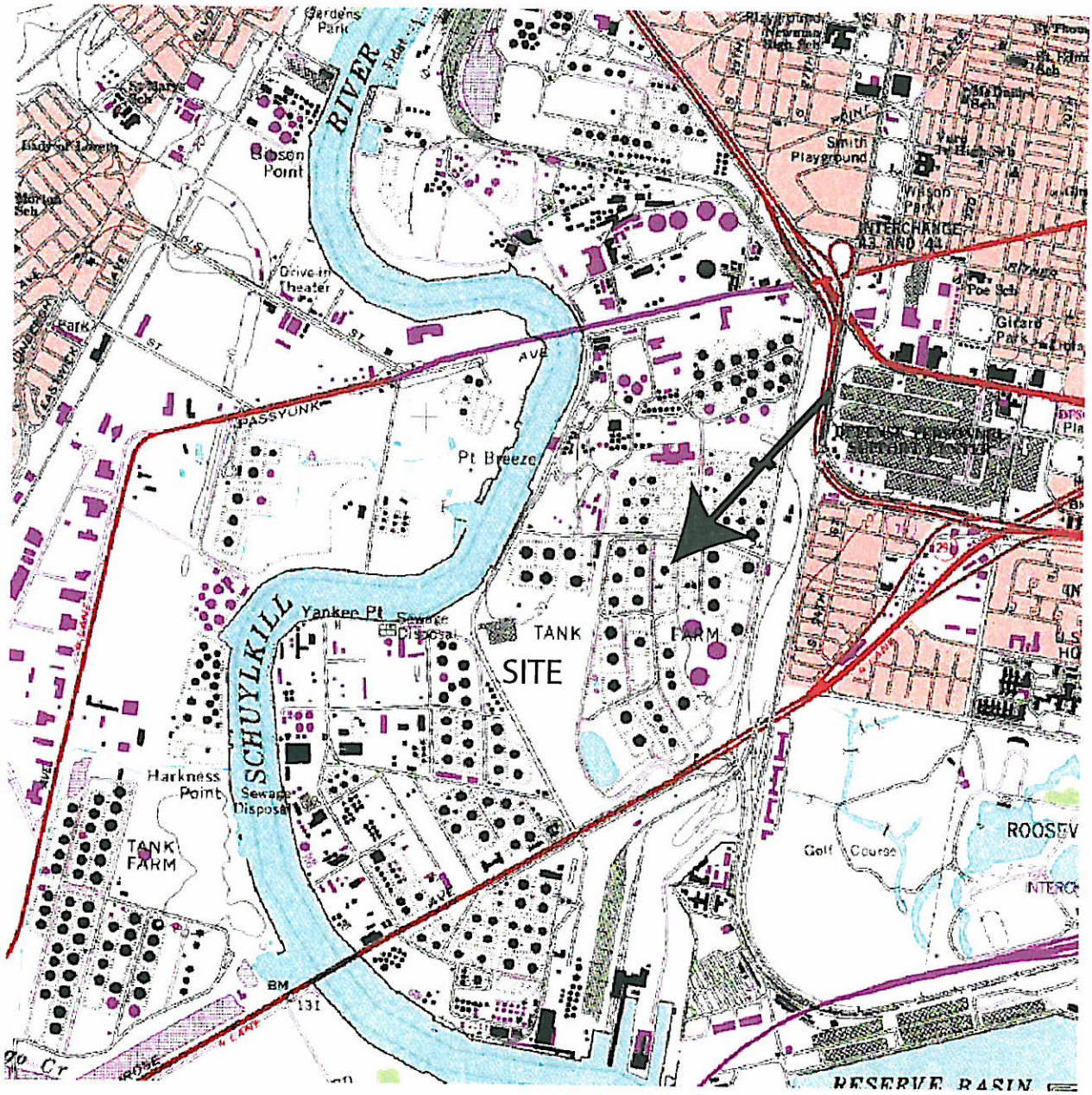
Site Location and Sampling Map - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

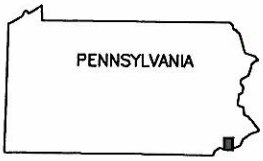
Facility Name and ID: 51 - 19781

County: Philadelphia

Township/Borough: Philadelphia

See FIGURE 1 and FIGURE 2





QUADRANGLE LOCATION

N

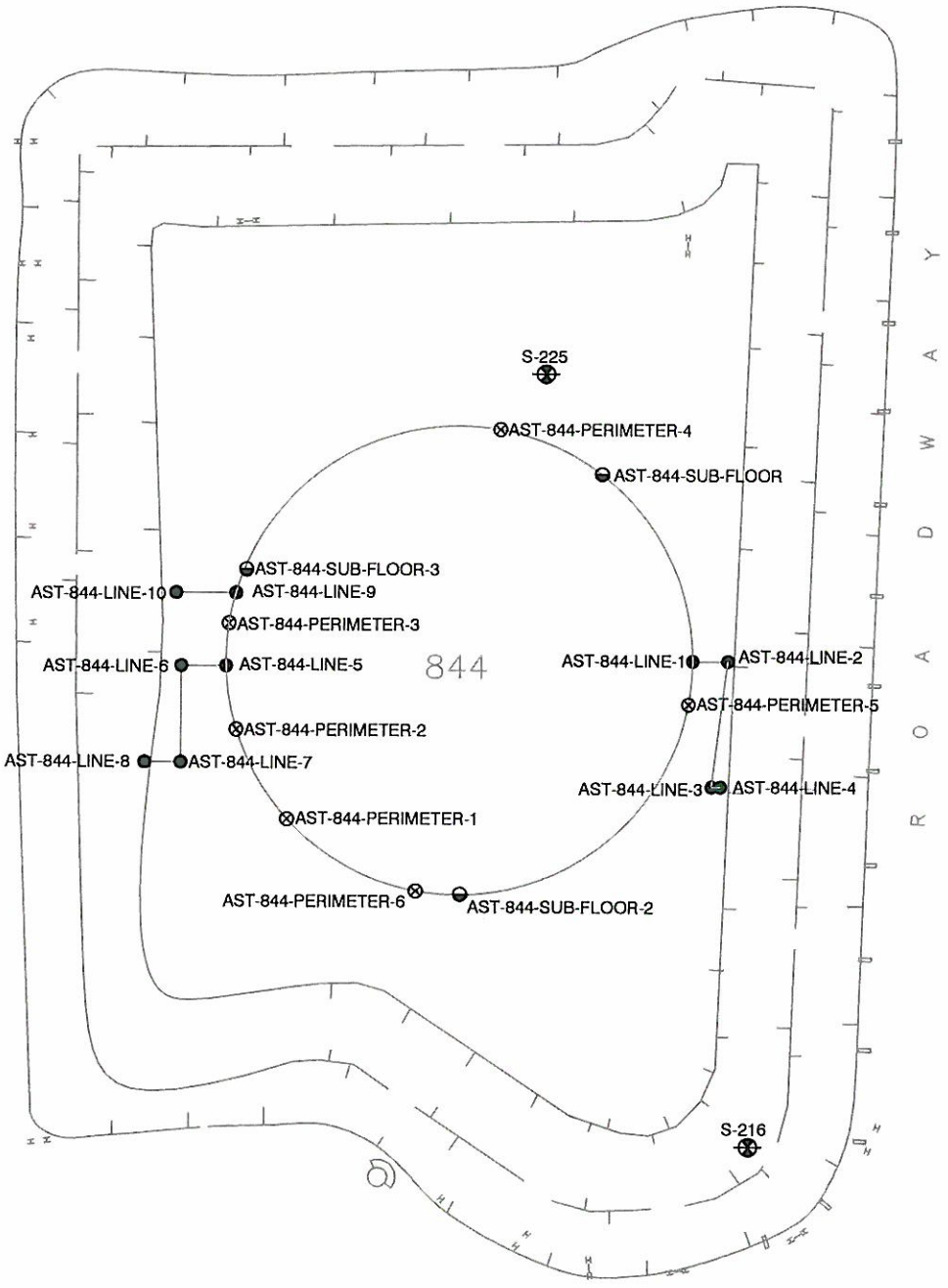
0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:		SITE LOCATION MAP PHILADELPHIA REFINERY		FIGURE: 1
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA				
JOB NUMBER: 62SU.01095	DRAWN BY: KEF	CHECKED BY: CY	APPROVED BY:	DATE: 04/17/2006



SECOR 102 PICKERING WAY, SUITE 200 EXTON, PENNSYLVANIA PHONE: (484) 875-3075/875-9286 (FAX)	FOR: SUNOCO PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**AST-844** **CLOSURE SAMPLING LOCATIONS**		FIGURE: **2**
	JOB NUMBER: 62SU.01185.06/0003	**DRAWN BY:** KEF	**CHECKED BY:** CY	**APPROVED BY:**	**DATE:** 01/08/2007

SECOR
SECOR INTERNATIONAL INCORPORATED
www.secor.com
102 Pickering Way, Suite 200
Exton, PA 19341
484-875-3075 TEL
484-875-9286 FAX

February 28, 2008

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-845 (PA Registration #113A)**
Tank Closure, Confirmatory Sampling Activities Report
Sunoco, Inc. (R&M) –Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID# 51-19781

Dear Mr. Rosendorn:

This letter summarizes the confirmatory sampling activities that were conducted in the vicinity of aboveground storage tank (AST) PB-845. The project site is located at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Confirmatory sampling activities were conducted for the closure of AST PB-845. A Pennsylvania Department of Environmental Protection (PADEP) Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by SUNOCO.

Soil Sampling Activities

AST PB-845 is a 150-foot diameter AST that previously contained crude oil. For ASTs with a diameter greater than 90 feet, the PADEP Closure Requirements for Aboveground Storage Tank Systems (Closure Requirements) specifies the collection of soil samples from both the perimeter of the AST and from below the AST is to be determined upon consultation with the DEP regional office. Per conversation with Walter Payne of PADEP the samples were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter. As a result of previous unsuccessful attempts to collect soil samples with a hand auger from below the center of other ASTs, an Alternative Confirmatory Sampling Plan for AST Closures (Alternative Plan) was submitted by SUNOCO to PADEP on March 16, 2006. The Alternative Plan proposed to collect three soil samples from angled drilling in lieu of sampling directly beneath the AST. The angled drilling would take place external to the tank shell and would be directed towards the center of the tank to a vertical depth of at least five feet. The Alternative Plan was approved by Walter Payne of PADEP in an April 5, 2006 letter

with the stipulation that the number of soil samples to be collected matched the number of soil samples specified in the Closure Requirements.

A total of six perimeter soil samples (845-Perimeter-1, 845-Perimeter-2, and 845-Perimeter-3, 845-Perimeter-4, 845-Perimeter-5, and 845-Perimeter-6) and three angled soil samples (845-Sub-1, 845-Sub-2, and 845-Sub-3) were collected using a truck mounted Geoprobe® rig. Soil samples 845-Perimeter-1 through 845-Perimeter-6 were collected at a depth of approximately three feet below grade (fbg). Soil samples 845-Sub-1 through 845-Sub-3 were collected at a vertical depth of approximately five fbg (the borings were advanced 7 feet at a 45° angle under AST PB-201).

As per the Closure Requirements at least one soil sample must be collected from aboveground or underground piping, biased towards pipe junctures/joints and control valves. A total of five soil samples were collected from one above ground pipelines at AST PB-201. A total of six soil samples were collected from below the above ground pipeline (AST-845-LINE-1, AST-845-LINE-2, AST-845-LINE-3, AST-845-LINE-4, and AST-845-LINE-5). Soil sampling locations are depicted on **Figure 2**.

Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (with the exception of lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, cumene and naphthalene by EPA Method 8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP developed MSCs for soils are based on direct contact exposure scenarios and MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs, or Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended regarding the closure-in-place for AST PB-845.

A copy of the PADEP Aboveground Storage Tank System Closure Report Form is included in **Appendix B**.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

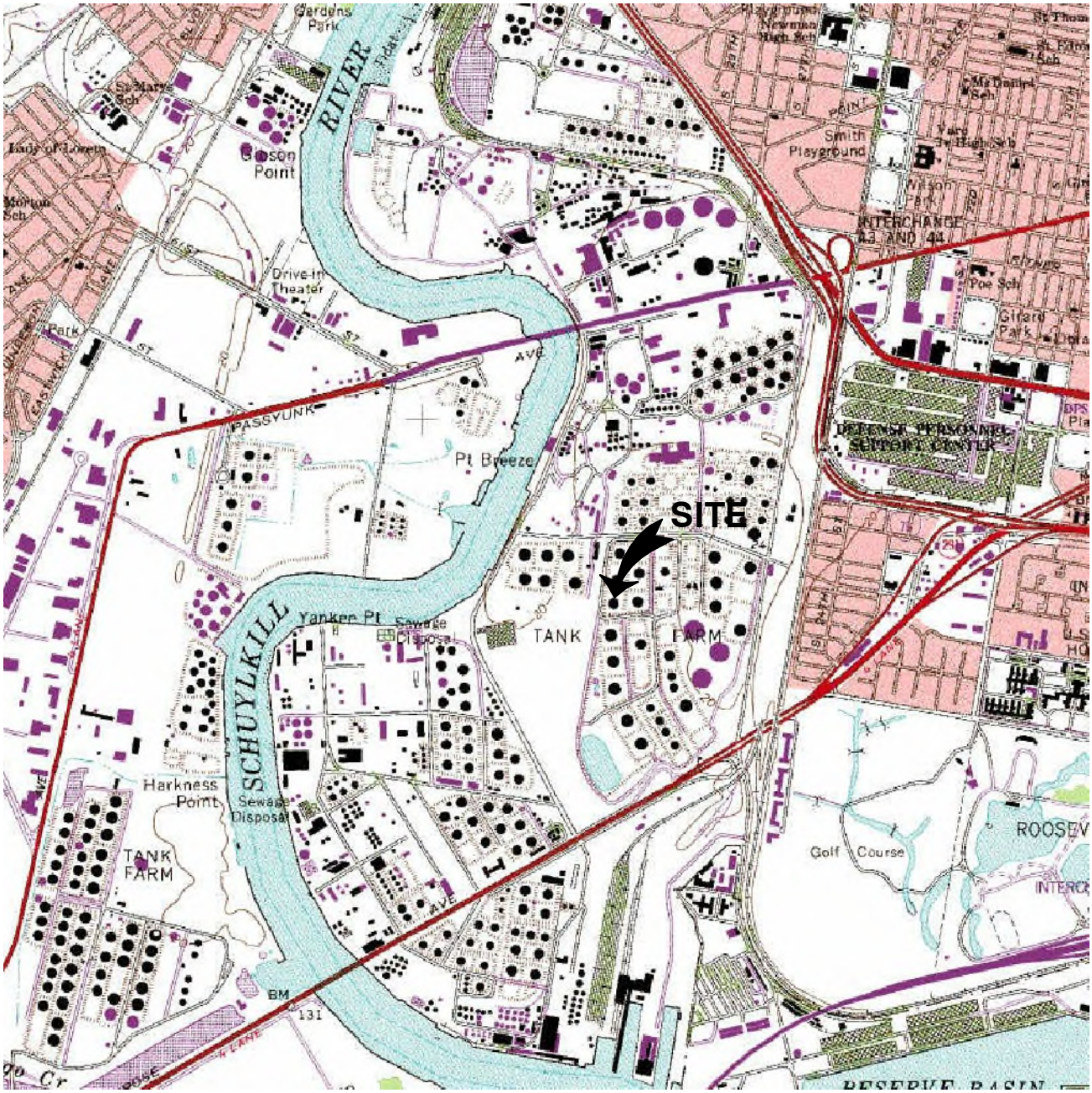
Sincerely,
SECOR International Incorporated

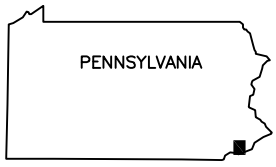
Casey Yetman

Casey Yetman
Project Manager

cc: Project File

FIGURES





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

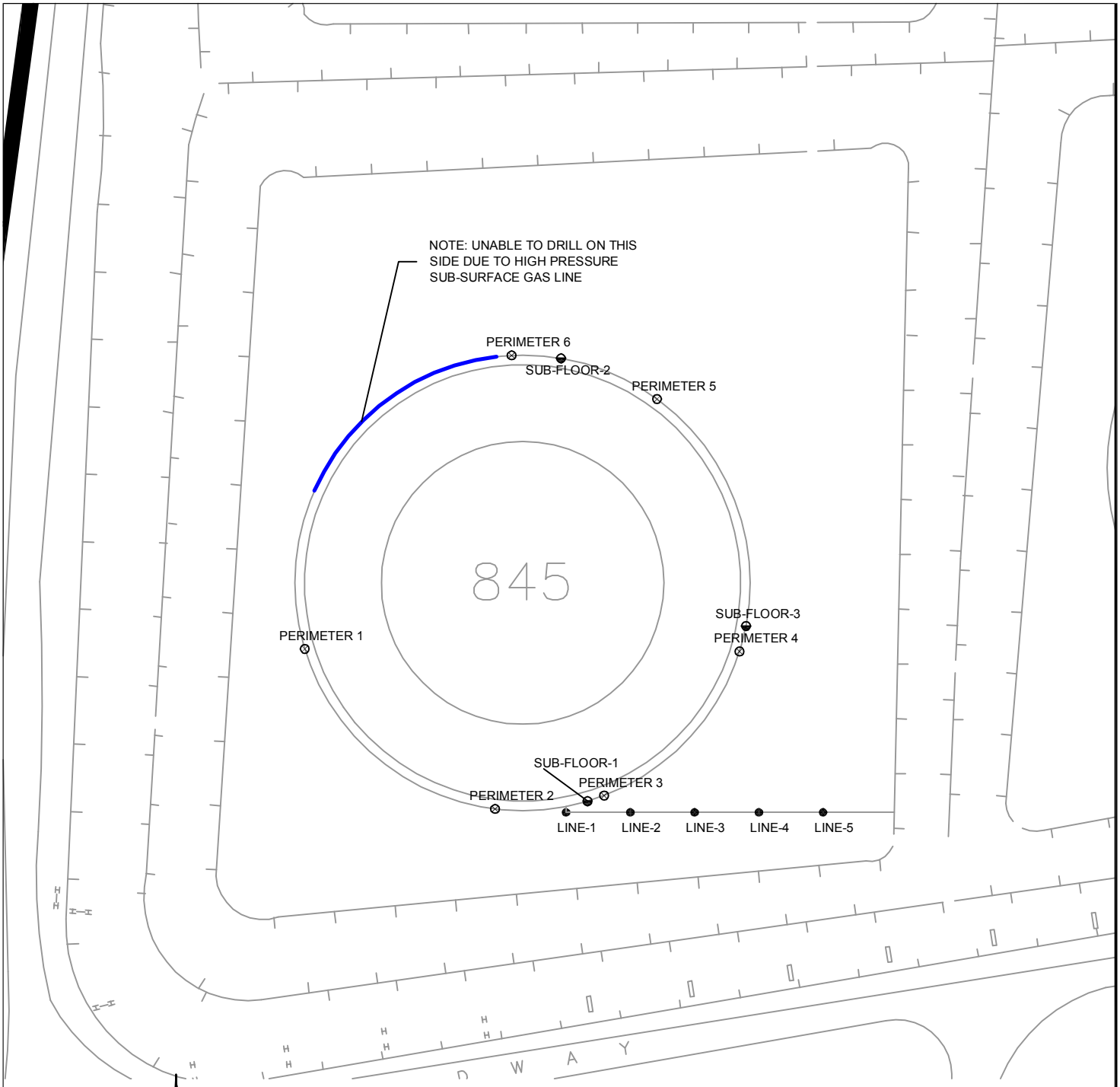
SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:
SUNOCO, INC.
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

SITE LOCATION MAP
FORMER TANK PB-845 AREA

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	TFB	CY		03/20/2008



NOTE: SAMPLE DEPTH PROVIDED NEXT TO SAMPLE LOCATION POINT

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075 FAX: (484) 875-9286

FOR:		PB-845 CLOSURE SAMPLING LOCATIONS	FIGURE: 2
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA			
JOB NUMBER:	DRAWN BY: TFB	CHECKED BY:	APPROVED BY:	DATE: 11/13/2007

TABLES

Table 1
Summary of Soil Analytical Results
AST PB-845
Sunoco Philadelphia Refinery

Sample Identification	MSCs			845-Perimeter-1	845-Perimeter-2	845-Perimeter-3	845-Perimeter-4	845-Perimeter-5	845-Perimeter-6	845-Sub-1
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	5-5.5
Sample Collection Date				8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	2/12/2008	8/24/2006
VOCs										
Benzene	210,000	240,000	500	ND (28)	ND (26)	ND (29)	ND (28)	ND (29)	ND (25)	ND (28)
Toluene	10,000,000	10,000,000	100,000	ND (57)	ND (52)	ND (57)	ND (56)	ND (57)	ND (50)	ND (55)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (57)	ND (52)	ND (57)	ND (56)	ND (57)	ND (50)	ND (55)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (57)	ND (52)	ND (57)	ND (56)	180 J	ND (50)	ND (55)
Naphthalene	56,000,000	190,000,000	25,000	ND (57)	120 J	ND (57)	ND (56)	1,200	74 J	ND (55)
SVOCs										
Anthracene	190,000,000	190,000,000	350,000	ND (40)	1,200	430	240	ND (200)	ND (36)	400
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (40)	2,800	1,500	750	590 J	ND (36)	1,200
Benzo(a)pyrene	11,000	190,000,000	46,000	44 J	2,300	1,400	680	650 J	52 J	860
Benzo(b)fluoranthene	110,000	190,000,000	170,000	50 J	2,800	1,600	880	1,200	64 J	1,200
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	56 J	1,400	840	460	720 J	74 J	480
Chrysene	11,000,000	190,000,000	230,000	68 J	2,800	1,500	740	3,100	64 J	1,200
Fluorene	110,000,000	190,000,000	3,800,000	ND (40)	510	180 J	130	590 J	ND (36)	190 J
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (40)	1,400	810	430	480 J	39 J	530
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (40)	4,300	2,000	970	1,800	ND (36)	1,700
Pyrene	84,000,000	190,000,000	2,200,000	57 J	4,400	2,600	1,300	2,000	46 J	2,200

Sample Identification	MSCs			845-Sub-2	845-Sub-3	AST-845-LINE-1	AST-845-LINE-2	AST-845-LINE-3	AST-845-LINE-4	AST-846-LINE-5
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	5-5.5	5-5.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Sample Collection Date				8/24/2006	8/24/2006	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007
VOCs										
Benzene	210,000	240,000	500	ND (29)	ND (27)	ND (97)	ND (120)	ND (100)	ND (120)	ND (130)
Toluene	10,000,000	10,000,000	100,000	ND (58)	ND (54)	ND (97)	ND (120)	ND (100)	ND (120)	ND (130)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (58)	ND (54)	ND (97)	ND (120)	ND (100)	ND (120)	ND (130)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (58)	ND (54)	ND (97)	ND (120)	ND (100)	ND (120)	ND (130)
Naphthalene	56,000,000	190,000,000	25,000	ND (58)	450.0	ND (97)	ND (120)	ND (100)	ND (120)	ND (130)
SVOCs										
Anthracene	190,000,000	190,000,000	350,000	110 J	590	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Benzo(a)anthracene	110,000	190,000,000	320,000	110 J	640	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Benzo(a)pyrene	11,000	190,000,000	46,000	85 J	440	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	120 J	650	ND (420)	ND (410)	ND (390)	470	530
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	51 J	250	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Chrysene	11,000,000	190,000,000	230,000	140 J	660	ND (420)	450	ND (390)	ND (400)	490
Fluorene	110,000,000	190,000,000	3,800,000	190 J	520	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	61 J	270	ND (420)	ND (410)	ND (390)	ND (400)	ND (370)
Phenanthrene	190,000,000	190,000,000	10,000,000	620	1,900	ND (420)	640	ND (390)	ND (400)	660
Pyrene	84,000,000	190,000,000	2,200,000	280	1,300	ND (420)	640	450	620	1,000

Notes:

FBG = Feet Below Grade

All concentrations are in ug/kg (micrograms per kilogram)

ND (30) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Laboratory Analytical Report

April 5, 2007

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Dear Ms. Yetman:

Enclosed are analytical results for samples submitted to Pace Analytical by Sunoco_SECOR International, Inc. - Exton. The samples were received on March 20, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-2076 when inquiring about this report.

Client Site: 6250-01
Client Ref.: AST-845

Pace Sample Identification	Client Sample Identification
0703-3404	AST-845-LINE-1
0703-3405	AST-845-LINE-2
0703-3406	AST-845-LINE-3
0703-3407	AST-845-LINE-4
0703-3408	AST-845-LINE-5

General Comments: Cooler temperature 3 ° C upon receipt. Ice was present.

Please call me if you have any questions regarding the information contained within this report.

Sincerely,

Carin A. Ferris
Project Manager

CAM: cam

Enclosures

Page 1 of ____

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3404**
Client Sample ID: AST-845-LINE-1
Sample Matrix: Solid

Client Site: 6250-01
Client Ref.: AST-845

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	79	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C[(1)]	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[(1)]	<97	97	ug/kg	MAK	03/28/2007	0059060-1	<250

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3405**
Client Sample ID: AST-845-LINE-2
Sample Matrix: Solid

Client Site: 6250-01
Client Ref.: AST-845

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	81	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C[(1)]	450	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[(1)]	<410	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C[(1)]	640	410	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C[(1)]	640	410	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3406**
Client Sample ID: AST-845-LINE-3
Sample Matrix: Solid

Client Site: 6250-01
Client Ref.: AST-845

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	86	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C[(1)]	<390	390	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C[(1)]	450	390	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[(1)]	<100	100	ug/kg	MAK	03/28/2007	0059060-1	<250

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Lab Project ID: **07-2076**
Lab Sample ID: **0703-3407**
Client Sample ID: AST-845-LINE-4
Sample Matrix: Solid

Client Site: 6250-01
Client Ref.: AST-845

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	83	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[(1)]	470	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C[(1)]	<400	400	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C[(1)]	620	400	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[(1)]	<120	120	ug/kg	MAK	03/28/2007	0059060-1	<250

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Lab Project ID: **07-2076**
Lab Sample ID: **0703-3408**
Client Sample ID: AST-845-LINE-5
Sample Matrix: Solid

Client Site: 6250-01
Client Ref.: AST-845

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	89	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<370	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C[1]	490	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C[1]	<370	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[1]	530	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[1]	<370	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C[1]	490	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C[1]	<370	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<370	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C[1]	660	370	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C[1]	1000	370	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[1]	<130	130	ug/kg	MAK	03/28/2007	0059060-1	<250

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Lancaster Laboratories

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1003270. Samples arrived at the laboratory on Friday, August 25, 2006.

Client Description	Lancaster Labs Number
845 Perimeter 1 Grab Soil Sample	4851973
845 Perimeter 2 Grab Soil Sample	4851974
845 Perimeter 3 Grab Soil Sample	4851975
845 Perimeter 4 Grab Soil Sample	4851976
845 Perimeter 5 Grab Soil Sample	4851977
845 Sub 1 Grab Soil Sample	4851978
845 Sub 2 Grab Soil Sample	4851979
845 Sub 3 Grab Soil Sample	4851980

1 COPY TO SECOR International, Inc Attn: Casey Yetman

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,



Marla S. Lord
Senior Specialist

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851973

845 Perimeter 1 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 14:44 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.1		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	57.	J	40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		40.	ug/kg	1
03782	Chrysene	218-01-9	68.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	50.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	44.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	56.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	47.8
05466	Toluene	108-88-3	N.D.		57.	ug/kg	47.8
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	47.8
05479	Isopropylbenzene	98-82-8	N.D.		57.	ug/kg	47.8
05498	Naphthalene	91-20-3	N.D.		57.	ug/kg	47.8

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 11:10	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 15:51	Robin C Runkle	47.8

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Analysis Report

Lancaster Laboratories Sample No. SW 4851973

845 Perimeter 1 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 14:44 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:34	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851974

845 Perimeter 2 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 14:55 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	4,400.		78.	ug/kg	2
03768	Fluorene	86-73-7	510.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	4,300.		78.	ug/kg	2
03776	Anthracene	120-12-7	1,200.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	2,800.		39.	ug/kg	1
03782	Chrysene	218-01-9	2,800.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	2,800.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	2,300.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,400.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,400.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		26.	ug/kg	45.13
05466	Toluene	108-88-3	N.D.		52.	ug/kg	45.13
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	45.13
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	45.13
05498	Naphthalene	91-20-3	120.	J	52.	ug/kg	45.13

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 11:31	Mark A Clark	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 16:50	Mark A Clark	2

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Analysis Report

Lancaster Laboratories Sample No. SW 4851974

845 Perimeter 2 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 14:55 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
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845P2

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 16:13	Robin C Runkle	45.13
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:35	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851975

845 Perimeter 3 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:04 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,600.		39.	ug/kg	1
03768	Fluorene	86-73-7	180.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	2,000.		39.	ug/kg	1
03776	Anthracene	120-12-7	430.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	1,500.		39.	ug/kg	1
03782	Chrysene	218-01-9	1,500.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,600.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,400.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	810.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	840.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	49.12
05466	Toluene	108-88-3	N.D.		57.	ug/kg	49.12
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	49.12
05479	Isopropylbenzene	98-82-8	N.D.		57.	ug/kg	49.12
05498	Naphthalene	91-20-3	N.D.		57.	ug/kg	49.12

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 11:52	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 16:36	Robin C Runkle	49.12

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Analysis Report

Lancaster Laboratories Sample No. SW 4851975

845 Perimeter 3 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:04 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:36	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851976

845 Perimeter 4 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:35 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,300.		38.	ug/kg	1
03768	Fluorene	86-73-7	130.	J	38.	ug/kg	1
03775	Phenanthrene	85-01-8	970.		38.	ug/kg	1
03776	Anthracene	120-12-7	240.		38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	750.		38.	ug/kg	1
03782	Chrysene	218-01-9	740.		38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	880.		38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	680.		38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	430.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	460.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	48.45
05466	Toluene	108-88-3	N.D.		56.	ug/kg	48.45
05474	Ethylbenzene	100-41-4	N.D.		56.	ug/kg	48.45
05479	Isopropylbenzene	98-82-8	N.D.		56.	ug/kg	48.45
05498	Naphthalene	91-20-3	N.D.		56.	ug/kg	48.45

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 12:13	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 16:59	Robin C Runkle	48.45

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Analysis Report

Lancaster Laboratories Sample No. SW 4851976

845 Perimeter 4 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:35 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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Suite 200
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Exton PA 19341

845P4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:37	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851977

845 Perimeter 5 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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Exton PA 19341

845P5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,000.		200.	ug/kg	1
03768	Fluorene	86-73-7	590.	J	200.	ug/kg	1
03775	Phenanthrene	85-01-8	1,800.		200.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		200.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	590.	J	200.	ug/kg	1
03782	Chrysene	218-01-9	3,100.		200.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,200.		200.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	650.	J	200.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	480.	J	200.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	720.	J	200.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits were not attained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	47.66
05466	Toluene	108-88-3	N.D.		57.	ug/kg	47.66
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	47.66
05479	Isopropylbenzene	98-82-8	180.	J	57.	ug/kg	47.66
05498	Naphthalene	91-20-3	1,200.		57.	ug/kg	47.66

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851977

845 Perimeter 5 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:30 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845P5

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 12:33	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 17:21	Robin C Runkle	47.66
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:38	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851978

845 Sub 1 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845S1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	2,200.		39.	ug/kg	1
03768	Fluorene	86-73-7	190.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	1,700.		39.	ug/kg	1
03776	Anthracene	120-12-7	400.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	1,200.		39.	ug/kg	1
03782	Chrysene	218-01-9	1,200.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,200.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	860.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	530.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	480.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	46.95
05466	Toluene	108-88-3	N.D.		55.	ug/kg	46.95
05474	Ethylbenzene	100-41-4	N.D.		55.	ug/kg	46.95
05479	Isopropylbenzene	98-82-8	N.D.		55.	ug/kg	46.95
05498	Naphthalene	91-20-3	67.	J	55.	ug/kg	46.95

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:39	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 17:43	Robin C Runkle	46.95

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Analysis Report

Lancaster Laboratories Sample No. SW 4851978

845 Sub 1 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:15 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845S1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:39	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 15:00	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851979

845 Sub 2 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 16:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845S2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	280.		40.	ug/kg	1
03768	Fluorene	86-73-7	190.	J	40.	ug/kg	1
03775	Phenanthrene	85-01-8	620.		40.	ug/kg	1
03776	Anthracene	120-12-7	110.	J	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	110.	J	40.	ug/kg	1
03782	Chrysene	218-01-9	140.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	120.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	85.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	61.	J	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	51.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	48.83
05466	Toluene	108-88-3	N.D.		58.	ug/kg	48.83
05474	Ethylbenzene	100-41-4	N.D.		58.	ug/kg	48.83
05479	Isopropylbenzene	98-82-8	N.D.		58.	ug/kg	48.83
05498	Naphthalene	91-20-3	310.		58.	ug/kg	48.83

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 05:02	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 18:06	Robin C Runkle	48.83

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Analysis Report

Lancaster Laboratories Sample No. SW 4851979

845 Sub 2 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 16:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845S2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:40	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 15:00	Melida Reyes	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851980

845 Sub 3 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:48 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

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845S3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.9	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	1,300.	38.	ug/kg	1
03768	Fluorene	86-73-7	520.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	1,900.	38.	ug/kg	1
03776	Anthracene	120-12-7	590.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	640.	38.	ug/kg	1
03782	Chrysene	218-01-9	660.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	650.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	440.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	270.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	250.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	27.	ug/kg	47.53
05466	Toluene	108-88-3	N.D.	54.	ug/kg	47.53
05474	Ethylbenzene	100-41-4	N.D.	54.	ug/kg	47.53
05479	Isopropylbenzene	98-82-8	N.D.	54.	ug/kg	47.53
05498	Naphthalene	91-20-3	450.	54.	ug/kg	47.53

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:04	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 05:24	William T Parker	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 14:23	Robin C Runkle	47.53

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Analysis Report

Lancaster Laboratories Sample No. SW 4851980

845 Sub 3 Grab Soil Sample

SUN PHL PB 845
Collected:08/24/2006 15:48 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/07/2006 at 14:57
Discard: 09/22/2006

SECOR International, Inc
Suite 200
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845S3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:41	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 15:00	Melida Reyes	1

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc
Group Number: 1003270
Reported: 09/07/06 at 02:58 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 MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06240SLD026	Sample number(s): 4851973-4851977							
Pyrene	N.D.	33.	ug/kg	107		67-116		
Fluorene	N.D.	33.	ug/kg	99		66-115		
Phenanthrene	N.D.	33.	ug/kg	101		70-107		
Anthracene	N.D.	33.	ug/kg	99		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	95		73-111		
Chrysene	N.D.	33.	ug/kg	95		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	94		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	98		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	96		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	97		66-120		
Batch number: 06241820006A	Sample number(s): 4851973-4851980							
Moisture				100		99-101		
Batch number: 06241SLA026	Sample number(s): 4851978-4851980							
Pyrene	N.D.	33.	ug/kg	102		67-116		
Fluorene	N.D.	33.	ug/kg	95		66-115		
Phenanthrene	N.D.	33.	ug/kg	100		70-107		
Anthracene	N.D.	33.	ug/kg	98		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	96		73-111		
Chrysene	N.D.	33.	ug/kg	92		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	82		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	84		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	75		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	80		66-120		
Batch number: R062431AB	Sample number(s): 4851973-4851979							
Benzene	N.D.	25.	ug/kg	93	94	77-119	1	30
Toluene	N.D.	50.	ug/kg	93	96	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	92	94	82-115	2	30
Isopropylbenzene	N.D.	50.	ug/kg	86	88	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	72	75	52-121	4	30
Batch number: R062481AA	Sample number(s): 4851980							
Benzene	N.D.	25.	ug/kg	96	95	77-119	1	30
Toluene	N.D.	50.	ug/kg	96	95	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	94	93	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	88	87	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	74	76	52-121	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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003270
Reported: 09/07/06 at 02:58 PM

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 06240SLD026	Sample number(s): 4851973-4851977 UNSPK: P851958								
Pyrene	91	107	28-151	15	30				
Fluorene	79	85	47-126	7	30				
Phenanthrene	82	91	35-144	9	30				
Anthracene	82	92	38-142	12	30				
Benzo(a)anthracene	83	97	41-136	14	30				
Chrysene	78	94	40-135	17	30				
Benzo(b)fluoranthene	74	84	29-151	13	30				
Benzo(a)pyrene	78	93	37-144	17	30				
Indeno(1,2,3-cd)pyrene	76	90	39-141	17	30				
Benzo(g,h,i)perylene	77	91	33-145	16	30				
Batch number: 06241820006A	Sample number(s): 4851973-4851980 BKG: 4851977								
Moisture						16.8	16.1	4	15
Batch number: 06241SLA026	Sample number(s): 4851978-4851980 UNSPK: P851896								
Pyrene	100	95	28-151	5	30				
Fluorene	95	90	47-126	6	30				
Phenanthrene	99	95	35-144	4	30				
Anthracene	99	94	38-142	6	30				
Benzo(a)anthracene	96	92	41-136	5	30				
Chrysene	91	88	40-135	3	30				
Benzo(b)fluoranthene	81	76	29-151	6	30				
Benzo(a)pyrene	85	81	37-144	4	30				
Indeno(1,2,3-cd)pyrene	77	73	39-141	4	30				
Benzo(g,h,i)perylene	80	78	33-145	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: 06240SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851973	96	101	102
4851974	102	106	109
4851975	99	104	105
4851976	96	100	102
4851977	103	105	107
Blank	94	98	103
LCS	98	104	108
MS	83	87	88
MSD	95	96	103
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06241SLA026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851978	96	94	108
4851979	97	98	106

*- 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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003270
Reported: 09/07/06 at 02:58 PM

Surrogate Quality Control

4851980	96	98	113	
Blank	94	95	116	
LCS	95	95	111	
MS	99	100	108	
MSD	95	96	101	
Limits:	47-128	55-123	51-158	

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062431AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851973	86	93	81	80
4851974	88	96	84	84
4851975	75	81	71	69*
4851976	90	96	84	82
4851977	70*	75	63*	65*
4851978	75	79	71	70
4851979	79	84	74	76
Blank	100	107	98	89
LCS	80	86	80	78
LCSD	88	95	90	86
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062481AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851980	88	94	81	79
Blank	87	93	85	77
LCS	87	92	87	84
LCSD	84	93	85	83
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.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003270 Sample # 4851973-80

Chain 1 of 1

COC # 0133041

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only
FSC:
SCR#:

(1)
Client: SECOR Acct. #:
Project Name/#: SUN-PH2 PB 845 PWSID #:
Project Manager: C. Yetman P.O.#:
Sampler: R. Bauer Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water (☐ Potable ☐ NPDES)	Other	Total # of Containers	Fuel Oil No 4,5,6	Used Motor Oil (no lead)	Remarks
845 Perimeter 1	8/24/06	1444	X		X			2	✓		
845 Perimeter 2	8/24	1455	X		X			2	✓		
845 Perimeter 3	8/24	1504	X		X			2	✓		
845 Perimeter 4	8/24	1535	X		X			2	✓		
845 Perimeter 5	8/24	1530	X		X			2	✓		
845 SUB 1	8/24	1515	X		X			2	✓		temp 1.5-4.5°C
845 SUB 2	8/24	1610	X		X			2	✓		
845 SUB 3	8/24	1548	X		X			2	✓		

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

(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: cyetman@secor-com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8/25/06	1548
[signature]	8/25/06	1700			
			[signature]	[illegible]	1700

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.

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.

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:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1077642. Samples arrived at the laboratory on Thursday, February 14, 2008. The PO# for this group is PB-845.

Client Description	Lancaster Labs Number
PB-845-PER-6 Grab Soil Sample	5280668

1 COPY TO	SECOR International, Inc	Attn: Casey Mundry
ELECTRONIC COPY TO	LLI	Attn: EDD Group

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Chad A. Moline
Group Leader

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. SW5280668 Group No. 1077642

PB-845-PER-6 Grab Soil Sample
PB-845 COC: 174403

Collected:02/12/2008 12:50 by CM

Account Number: 11183

Submitted: 02/14/2008 17:30
Reported: 02/21/2008 at 23:35
Discard: 04/22/2008

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	8.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	46.	J	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		36.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		36.	ug/kg	1
03782	Chrysene	218-01-9	64.	J	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	64.	J	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	52.	J	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	39.	J	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	74.	J	36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		25.	ug/kg	46.04
05466	Toluene	108-88-3	N.D.		50.	ug/kg	46.04
05474	Ethylbenzene	100-41-4	N.D.		50.	ug/kg	46.04
05479	Isopropylbenzene	98-82-8	N.D.		50.	ug/kg	46.04
05498	Naphthalene	91-20-3	74.	J	50.	ug/kg	46.04

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/09

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
00111	Moisture	SM20 2540 G	1	02/18/2008 14:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	02/20/2008 08:47	Brian K Graham	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	02/21/2008 12:51	Stephanie A Selis	46.04

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW5280668 Group No. 1077642

PB-845-PER-6 Grab Soil Sample
PB-845 COC: 174403

Collected:02/12/2008 12:50 by CM

Account Number: 11183

Submitted: 02/14/2008 17:30
Reported: 02/21/2008 at 23:35
Discard: 04/22/2008

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

845P6

06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	02/12/2008 12:50	Client Supplied	1
07806	BNA Soil Extraction	SW-846 3550B	1	02/19/2008 16:50	Adrienne E Fellenbaum	1

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 02/21/08 at 11:35 PM

Group Number: 1077642

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 08049820002A	Sample number(s): 5280668							
Moisture				100		99-101		
Batch number: 08050SLB026	Sample number(s): 5280668							
Pyrene	N.D.	33.	ug/kg	83		75-115		
Fluorene	N.D.	33.	ug/kg	81		75-116		
Phenanthrene	N.D.	33.	ug/kg	85		77-113		
Anthracene	N.D.	33.	ug/kg	85		76-112		
Benzo(a)anthracene	N.D.	33.	ug/kg	83		73-112		
Chrysene	N.D.	33.	ug/kg	86		76-113		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	89		61-127		
Benzo(a)pyrene	N.D.	33.	ug/kg	92		69-122		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	86		64-119		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	89		65-122		
Batch number: Q080521AA	Sample number(s): 5280668							
Benzene	N.D.	25.	ug/kg	99	97	84-115	2	30
Toluene	N.D.	50.	ug/kg	97	97	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	91	91	82-115	0	30
Isopropylbenzene	N.D.	50.	ug/kg	89	87	82-110	1	30
Naphthalene	N.D.	50.	ug/kg	93	97	62-116	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: 08049820002A	Sample number(s): 5280668			BKG: 5280668					
Moisture						8.5	9.0	5	15
Batch number: 08050SLB026	Sample number(s): 5280668			UNSPK: P281666					
Pyrene	84	89	19-162	5	30				
Fluorene	85	84	42-139	1	30				
Phenanthrene	85	88	1-181	3	30				
Anthracene	85	89	34-148	5	30				
Benzo(a)anthracene	81	86	20-156	5	30				
Chrysene	83	90	19-158	7	30				
Benzo(b)fluoranthene	91	84	13-161	7	30				
Benzo(a)pyrene	90	44	24-154	70*	30				
Indeno(1,2,3-cd)pyrene	83	86	26-152	3	30				
Benzo(g,h,i)perylene	86	88	26-154	3	30				

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1077642
Reported: 02/21/08 at 11:35 PM

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: 08050SLB026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
5280668	72	80	79
Blank	85	86	86
LCS	76	77	81
MS	82	81	82
MSD	75	77	87
Limits:	49-120	55-117	43-131

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q080521AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
5280668	89	87	78	77
Blank	99	96	87	84
LCS	102	100	90	89
LCSD	102	100	92	89
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 unspiked result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1077642 Sample # 5280668

COC # 174403

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only
FSC:
SCR#: 54484

(1) Client: SECOR Acct. #:
Project Name/#: PB-845 PWSID #:
Project Manager: Casey Mundry P.O.#:
Sampler: CY Quote #:
Name of state where samples were collected: PA

(5) Analyses Requested — Preservation Codes

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	Matrix (4) Soil	Water (☐ Potable ☐ NPDES)	Other	Total # of Containers	PADEP Shortlist	for Fuel Oil	4.5 ÷ 6 and	Used motor	Oil (no lead)					Remarks	(6) Temperature of samples upon receipt (if requested)
PB-845-PER-6	2.12.08	1250	X		X			2	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 #: 484.875.3078 Fax #: 484.875.9286
E-mail address: cmundry@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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	01/30/08	01:30	[signature]	01/30/08	01:30
[signature]	01/30/08	08:30			
Casey [signature]	2/14/08	10:50	Marvin McLallister	2/14/08	10:50
Marvin McLallister	2/14/08	12:30			
			Katie Hartlane	2/14/08	17:30

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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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APPENDIX B

PADEP Aboveground Storage Tank System Closure Report Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

51-19781
Facility I.D.

Philadelphia
Municipality

Philadelphia
County

Date Prepared

Ron Rosendorn
Name of Person Submitting Report
(Please Print)

Sunoco, Inc. (R & M)
Company Name
(If Applicable)

Sr. Environmental Engineer
Title

Closure Method (Check all that apply):

- ☒ AST Removal
- ☐ AST Closure-In-Place
- ☐ AST Change-In-Service

Site Assessment Results (Check all that apply):

- ☒ No Obvious Contamination - Sample Results Meet Standards/Levels
- ☐ No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Owners who are permanently closing aboveground storage tanks may use this form to demonstrate that a storage tank closure was performed in accordance with the "Closure Requirements for Aboveground Storage Tank Systems" document.
PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-19781
2. Facility Name Sunoco, Inc.
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
6. Facility Contact Person Ron Rosendorn
7. Facility Telephone Number (215)
8. Owner Name Sunoco, Inc.
9. Owner Mailing Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
10. Description of Aboveground Storage Tanks (Complete for each tank closed)

DATE OF TANK CLOSURE (Month/Day/Year)		12/28/06	12/28/06	12/28/06	7/11/06
Tank Registration Number		102A	113A	114A	180A
Estimated Total Capacity (Gallons)		6346200	6346200	6346200	40000
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify	Hvy Gas Oil	Crude Oil	Crude Oil	Catacarb
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☒
	Name of Principal CERCLA Substance				Diethanol amine
	AND				
	Chemical Abstract Service (CAS) No.				111422
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☒	☒	☒	☒
	b. Closure-in-Place	☐	☐	☐	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)		No	No	No	No

DATE OF TANK CLOSURE (Month/Day/Year)					
Tank Registration Number					
Estimated Total Capacity (Gallons)					
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify				
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☐
	Name of Principal CERCLA Substance				
	AND				
	Chemical Abstract Service (CAS) No.				
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☐	☐	☐	☐
	b. Closure-in-Place	☐	☐	☐	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)					

Yes **N/A**

☒ ☐ 11. Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of tanks:**

The storage tank facility includes over 100 bulk storage tanks involved with the oil refining process. Most of the tanks contain petroleum feedstocks, intermediates, and refined products. The balance of tanks are chemical additives.

☐ ☒ 12. A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.

☐ ☒ 13. Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).

☒ ☐ 14. An amended "Registration/Permitting of Storage Tanks" form was submitted to the DEP, Bureau of Land Recycling and Waste Management, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 8/3/06 (180A); 12/28/06 (102A, 113A, 114A)

☐ ☒ 15. If a reportable release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: _____ Office: _____

Yes N/A

☒ ☐ 16. If tanks were cleaned on-site:

a. Briefly describe the disposition of usable product: Usable product was transferred to another available on-site product tank.

b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
Non-hazardous tank residue/solids were containerized in roll-off dumpsters and transported to a subtitle D non-hazardous landfill (Grows Landfill - Morrisville, PA) Tanks were cleaned 5+ years ago. Archived waste manifests are kept at Iron Mountain records retention facility.

c. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: N/A

(2) Licensed Hazardous Waste Transporter Name and ID Number: N/A - not RCRA hazardous at time of cleaning.

☐ ☒ 17. If tanks were removed from the site for cleaning:

a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning:

b. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):
All steel scrap was taken to International Scrap, Inc.

☐ ☒ 19. If contaminated soil is excavated:

a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):

b. If contaminated soil is determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

Yes N/A

☐ ☒ 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

_____

_____

_____

☐ ☒ 21. If the tanks were "Closed-in-Place" provide information below:

a. Briefly describe the tank cleaning process: _____

_____

_____

b. If subcontracted, name and address of company that performed the tank cleaning:

_____

_____

c. How were tanks marked/labeled with permanent closure date: _____

_____

_____

I, Michael G. McKee, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating
(Print Name)
to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

_____ _____

Signature of Tank Owner Date

Printed on Recycled Paper

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION II. Tank Handling Information

Facility ID Number 51-19781
Tank Registration ID Number(s) 113A

Yes	N/A		
		1.	Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil and debris: N/A
		2.	Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping: Aboveground pipe internals were cleaned using a high pressure water wash. Piping was sent for scrap 6" x 1500'. Piping was in good condition. There was no underground piping.
		3.	Briefly describe the condition of the tanks and any problems encountered during tank handling or tank removal activities: No problems.
		4.	Briefly describe the method used to purge the tanks of and monitor for hazardous or explosive vapors: Tank was flushed with #2 oil and then water washed.
☒	☐	5.	If tanks were cleaned on-site: a. Briefly describe the tank cleaning process: Tank was flushed with #2 oil and then water washed. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP. b. If subcontracted, name and address of company that performed the tank cleaning: Snow Environmental Services, 227 Pennel Road, Aston, PA
☐	☒	6.	If tanks were closed-in-place, briefly describe how tanks were rendered inoperative, marked permanently closed with date, vented and secured to prevent unauthorized entry: I

SECTION II. (continued)

☐ ☒ 7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

I, Daniel Stabilito (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed the tank handling activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

12/28/06
Date

5371
Installer Certification Number

1643
Company Certification Number

LVI Environmental Services, Inc.
Company Name

415 Boot Road
Street

Downingtown, PA 19335
City/Town, State, Zip

610-518-0303
Phone

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 113A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51-19781

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water N/A feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

E. If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Ryan Bower (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

12/21/07
Date

Field Geologist
Title of Person Performing Site Assessment

SECOR International, Inc.
Name of Company Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM
CLOSURE REPORT FORM

Sample/Analysis Information
(Attachment for Section III.)
Facility ID Number 51-19781

Sample I.D. (See diagram)	Parameter	Analytical Method[1]		Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
see Table 1								

[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: 51 - 19781

County: Philadelphia

Township/Borough: Philadelphia

See FIGURE 1 and FIGURE 2

SECOR

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INTERNATIONAL
INCORPORATED

January 7, 2008

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-849 (PA Registration # 117 A)**
Tank Closure Confirmatory Sampling Activities Report
Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID# 51-19781

Dear Mr. Rosendorn:

This letter summarizes the confirmatory sampling activities that were conducted in the vicinity of aboveground storage tank (AST) PB-849. The project site is located at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Confirmatory sampling activities were conducted for the closure AST PB-849. A Pennsylvania Department of Environmental Protection (PADEP) Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by SUNOCO.

Soil Sampling Activities

AST PB-849 is a 48-foot diameter AST that previously contained recovered oil. For ASTs with a diameter greater than 25 feet and less then 60 feet, the PADEP Closure Requirements for Aboveground Storage Tank Systems (Closure Requirements) specifies the collection of five soil samples from the perimeter of the AST and one soil sample from below the AST. In addition four surface soil samples were collected from below the above ground piping at AST PB-849.

A total of five perimeter soil samples (PB-849-PER-1, PB-849-PER-2, PB-849-PER-3, PB-849-PER-4, and PB-849-PER-5) and one soil sample (PB-849-SUB-1) were collected using a truck mount Geobrobe® rig. Soil samples PB-849-PER-1 through PB-849-PER-5 were collected at a depth of approximately three feet below grade (fbg). Soil sample PB-849-SUB-1 was collected at approximately five fbg.

As per the Closure Requirements at least one soil sample must be collected from aboveground or underground piping, biased towards pipe junctures/joints and control valves. Four soil samples were collected from below aboveground pipelines at AST PB-849. Soil samples (PB-849-Line-1, PB-849-Line-2, PB-849-Line-3, and PB-849-Line-4) were collected approximately 0.5 feet below grade. The line soil samples were collected using a hand auger. Soil sampling locations are depicted on **Figure 2**.

Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (with the exception of lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, cumene and naphthalene by EPA Method 8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP developed MSCs for soils are based on direct contact exposure scenarios and MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A, 3B, 4A, and 4B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs, or Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended regarding the closure of AST PB-849.

A copy of the PADEP Aboveground Storage Tank System Closure Report Form is included in **Appendix B**.

Should you have any questions or comments, please feel free to contact me at (484) 875-3075.

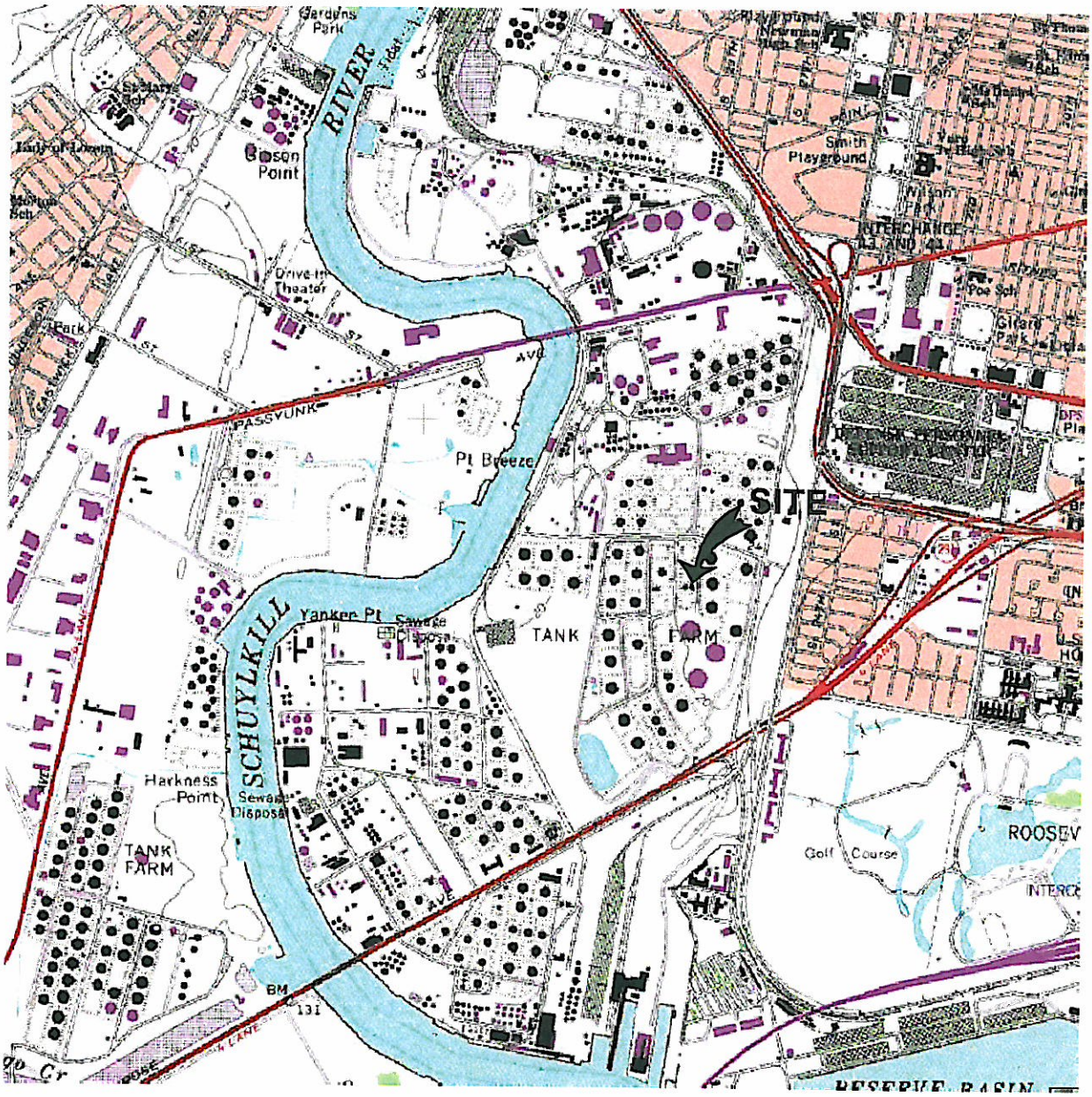
Sincerely,
SECOR International Incorporated

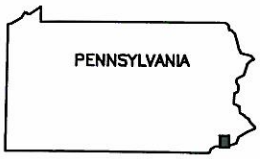


Casey Yetman Mundry
Project Manager

cc: Dina Toto (Sunoco)
Project File

FIGURES





QUADRANGLE LOCATION

N

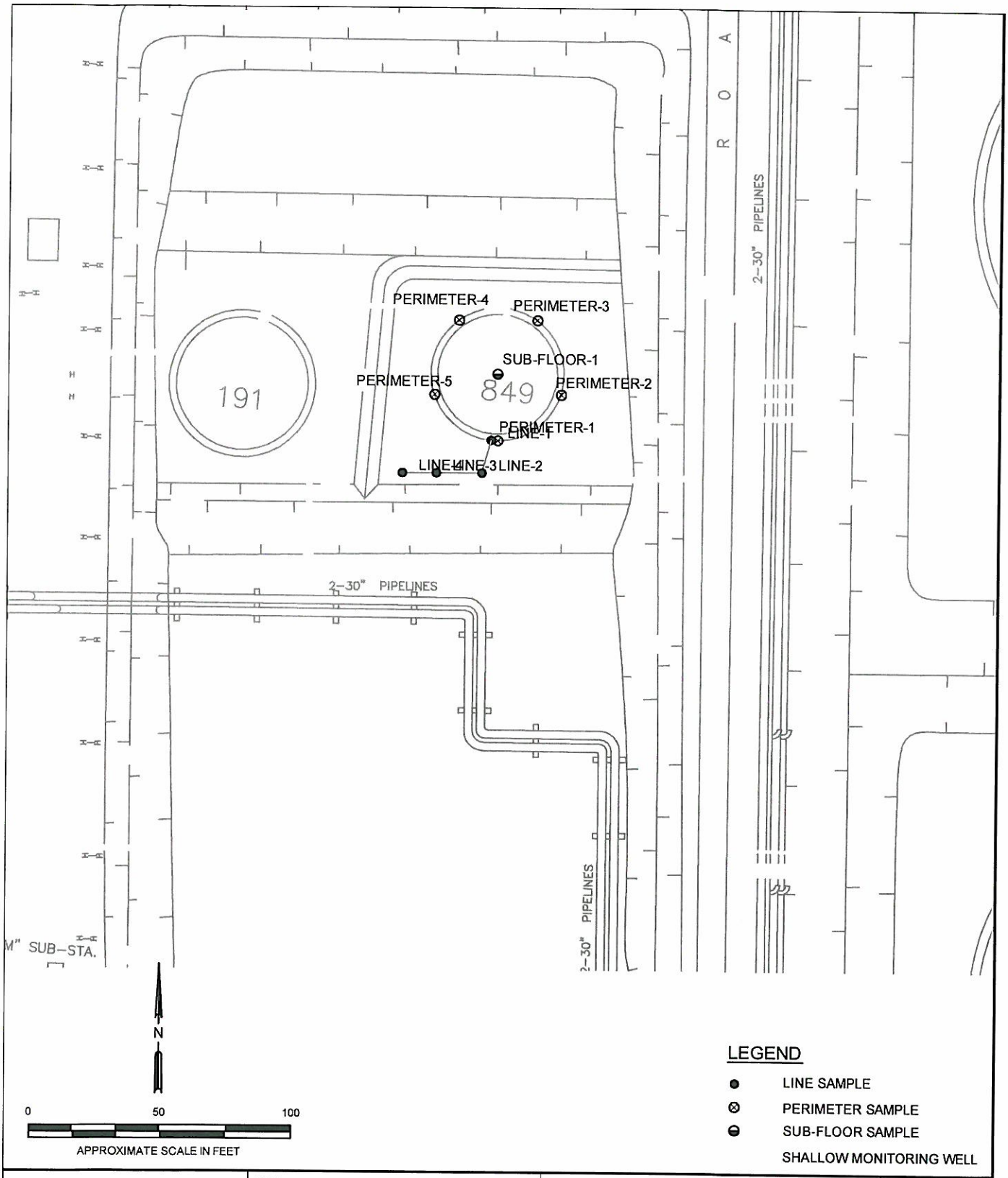
0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:				
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**SITE LOCATION MAP FORMER TANK PB-849 AREA**		FIGURE: **1**
JOB NUMBER:	DRAWN BY: TFB	CHECKED BY: CY	APPROVED BY:	DATE: 01/09/2008



SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075 FAX: (484) 875-9286

FOR:				FIGURE:
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		AST-849 CLOSURE SAMPLING LOCATIONS		2
JOB NUMBER:	DRAWN BY: TFB	CHECKED BY:	APPROVED BY:	DATE: 10/24/2007

TABLE

Table 1
Summary of Soil Analytical Results
AST PB-849
Sunoco Philadelphia Refinery

Sample Identification	MSCs			PB-849-PER-1	PB-849-PER-2	PB-849-PER-3	PB-849-PER-4	PB-849-PER-5
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5
Sample Collection Date				5/25/2007	5/25/2007	5/25/2007	5/25/2007	5/27/2007
VOCs								
Benzene	210,000	240,000	500	ND (180)	ND (160)	ND (290)	ND (160)	ND (150)
Toluene	10,000,000	10,000,000	100,000	ND (180)	ND (160)	ND (290)	ND (160)	ND (150)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (180)	ND (160)	ND (290)	ND (160)	ND (150)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (180)	ND (160)	ND (290)	ND (160)	ND (150)
Naphthalene	56,000,000	190,000,000	25,000	ND (180)	ND (160)	ND (290)	ND (160)	ND (150)
SVOCs								
Anthracene	190,000,000	190,000,000	350,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Chrysene	11,000,000	190,000,000	230,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Fluorene	110,000,000	190,000,000	3,800,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)
Pyrene	84,000,000	190,000,000	2,200,000	ND (400)	ND (400)	ND (400)	ND (370)	ND (400)

Sample Identification	MSCs			PB-849-SUB-1	PB-849-Line-1	PB-849-Line-2	PB-849-Line-3	PB-849-Line-4
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	5-5.5	0-0.5	0-0.5	0-0.5	0-0.5
Sample Collection Date				5/25/2007	9/4/2007	9/4/2007	9/4/2007	9/4/2007
VOCs								
Benzene	210,000	240,000	500	ND (310)	ND (5.6)	ND (6.1)	ND (6.1)	ND (5.8)
Toluene	10,000,000	10,000,000	100,000	ND (310)	ND (5.6)	ND (6.1)	ND (6.1)	ND (5.8)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (310)	ND (5.6)	ND (6.1)	ND (6.1)	ND (5.8)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (310)	ND (5.6)	ND (6.1)	ND (6.1)	ND (5.8)
Naphthalene	56,000,000	190,000,000	25,000	ND (310)	ND (5.6)	ND (6.1)	ND (6.1)	ND (5.8)
SVOCs								
Anthracene	190,000,000	190,000,000	350,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Chrysene	11,000,000	190,000,000	230,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Fluorene	110,000,000	190,000,000	3,800,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)
Pyrene	84,000,000	190,000,000	2,200,000	ND (420)	ND (3700)	ND (400)	ND (410)	ND (380)

Notes:

FBG = Feet Below Grade

All concentrations are in ug/kg (micrograms per kilogram)

ND (30) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Laboratory Analytical Report

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

June 13, 2007

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Dear Ms. Yetman:

Enclosed are analytical results for samples submitted to Pace Analytical by Sunoco_SECOR International, Inc. - Exton. The samples were received on May 31, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-4095 when inquiring about this report.

Client Site: Sunoco
Client Ref.: PB-849

Pace Sample Identification	Client Sample Identification
0705-4528	PB-849-PER1
0705-4529	PB-849-PER2
0705-4530	PB-849-PER3

Pace Sample Identification	Client Sample Identification
0705-4531	PB-849-PER4
0705-4532	PB-849-PER5
0705-4533	PB-849-SUB1

General Comments: This report has been reissued 6/29/07. Anthracene has been added as per client request. Please replace the original report with the revised report enclosed. Cooler temperature 4 ° C upon receipt. Ice was present.

Please call me if you have any questions regarding the information contained within this report.

Sincerely,

Carin A. Ferris

Carin A. Ferris
Project Manager

CAM: jld

Enclosures

REPORT OF LABORATORY ANALYSIS

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Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4528**
Client Sample ID: PB-849-PER1
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	82	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<180	180	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B(1)	<180	180	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B(1)	<180	180	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B(1)	<180	180	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B(1)	<180	180	ug/kg	JEC	06/06/2007	0061625-1	<5.0

(1) U.S. Environmental Protection Agency, 1996. Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4529**
Client Sample ID: PB-849-PER2
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	83	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C(1)	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4530**
Client Sample ID: PB-849-PER3
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	82	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<290	290	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B[1]	<290	290	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B[1]	<290	290	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B[1]	<290	290	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B[1]	<290	290	ug/kg	JEC	06/06/2007	0061625-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4531**
Client Sample ID: PB-849-PER4
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	89	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C(1)	<370	370	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B(1)	<160	160	ug/kg	JEC	06/06/2007	0061625-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4532**
Client Sample ID: PB-849-PER5
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	83	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C[1]	<400	400	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<150	150	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B[1]	<150	150	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B[1]	<150	150	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B[1]	<150	150	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B[1]	<150	150	ug/kg	JEC	06/06/2007	0061625-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-4095**
Lab Sample ID: **0705-4533**
Client Sample ID: PB-849-SUB1
Sample Matrix: Solid

Date Sampled: 05/25/2007
Date Received: 05/31/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	79	N/A	%	DAB	06/01/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)anthracene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(a)pyrene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(b)fluoranthene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Benzo(ghi)perylene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Chrysene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Fluorene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Phenanthrene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330
Pyrene	8270C(1)	<420	420	ug/kg	SPL	06/07/2007	0061325-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<310	310	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Cumene	8260B(1)	<310	310	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Ethylbenzene	8260B(1)	<310	310	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Naphthalene	8260B(1)	<310	310	ug/kg	JEC	06/06/2007	0061625-1	<5.0
Toluene	8260B(1)	<310	310	ug/kg	JEC	06/06/2007	0061625-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of 1041210

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Secor International Inc	Report To: [illegible]	Attention:
Address: [illegible] Suite 200 Ext. PA 19341	Copy To:	Company Name:
		Address:
Email To: [illegible]	Purchase Order No.:	Pace Quote Reference:
Phone: [illegible] Fax: [illegible]	Project Name: ASI 849	Pace Project Manager:
Requested Due Date/TAT:	Project Number:	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ Other_____

SITE LOCATION ☐GA ☐IL ☐IN ☐MI ☐MN ☐NC ☐OH ☐SC ☐WI ☐OTHER_____

Section D Required Client Information

SAMPLE ID

One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

Filtered (Y/N)

Requested Analysis: Fat Oil Grease, Hard Oil Grease, Oil (Fat Oil Grease)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Residual Chlorine (Y/N)	Pace Project Number / Lab I.D
1	~~GP-275-PER1~~	~~SL~~	~~G~~	~~[illegible]~~	~~1600~~														
2	PB-849-PER1	SL	G			F25071310			5							X	X	X	
3	PB-849-PER2	SL	G			F25071320			5							X	X	X	
4	PB-849-PER3	SL	G			F25071330			5							X	X	X	
5	PB-849-PER4	SL	G			F25071340			5							X	X	X	
6	PB-849-PER5	SL	G			F25071350			5							X	X	X	
7	PB-849-SUB1	SL	G			F25071400			5							X	X	X	
8																			
9																			
10																			
11																			
12																			

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible] Secor	[illegible]	1900			
			[illegible]		

SAMPLE CONDITION

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

SEE REVERSE SIDE FOR INSTRUCTIONS

ALLQ020rev.3,31Mar05

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Fax: 724.327.7793

September 25, 2007

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Dear Ms. Yetman:

Enclosed are analytical results for samples submitted to Pace Analytical by Sunoco_SECOR International, Inc. - Exton. The samples were received on September 7, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-6851 when inquiring about this report.

Client Site: Sunoco
Client Ref.: PB-849

Pace Sample Identification	Client Sample Identification
0709-0937	PB-849-LINE-1
0709-0938	PB-849-LINE-2
0709-0939	PB-849-LINE-3
0709-0940	PB-849-LINE-4

General Comments: Cooler temperature 14° C upon receipt. Ice was present, however it was partially melted.

Please call me if you have any questions regarding the information contained within this report.

Sincerely,

Carin A. Ferris

Carin A. Ferris
Project Manager

CAM: jld

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Page 1 of 6

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-6851**
Lab Sample ID: **0709-0937**
Client Sample ID: PB-849-LINE-1
Sample Matrix: Solid

Date Sampled: 09/04/2007
Date Received: 09/07/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	09/10/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(a)anthracene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(a)pyrene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(b)fluoranthene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(ghi)perylene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Chrysene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Fluorene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Phenanthrene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330
Pyrene	8270C[1]	<3700	3700	ug/kg	JAS	09/18/2007	0065131-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<5.6	5.6	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Cumene	8260B[1]	<5.6	5.6	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Ethylbenzene	8260B[1]	<5.6	5.6	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Naphthalene	8260B[1]	<5.6	5.6	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Toluene	8260B[1]	<5.6	5.6	ug/kg	JEC	09/13/2007	0065141-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence. Detection limits have been elevated due to sample matrix.

REPORT OF LABORATORY ANALYSIS

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: **07-6851**
Lab Sample ID: **0709-0938**
Client Sample ID: PB-849-LINE-2
Sample Matrix: Solid

Date Sampled: 09/04/2007
Date Received: 09/07/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	82	N/A	%	DAB	09/10/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(a)anthracene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(a)pyrene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(b)fluoranthene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Benzo(ghi)perylene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Chrysene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Fluorene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Phenanthrene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330
Pyrene	8270C[1]	<400	400	ug/kg	JAS	09/18/2007	0065131-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Cumene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Ethylbenzene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Naphthalene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Toluene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: 07-6851
Lab Sample ID: 0709-0939
Client Sample ID: PB-849-LINE-3
Sample Matrix: Solid

Date Sampled: 09/04/2007
Date Received: 09/07/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	82	N/A	%	DAB	09/10/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(a)anthracene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(a)pyrene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(b)fluoranthene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(ghi)perylene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Chrysene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Fluorene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Phenanthrene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330
Pyrene	8270C[1]	<410	410	ug/kg	SPL	09/24/2007	0065131-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Cumene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Ethylbenzene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Naphthalene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Toluene	8260B[1]	<6.1	6.1	ug/kg	JEC	09/13/2007	0065141-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: Sunoco
Client Ref.: PB-849

Lab Project ID: 07-6851
Lab Sample ID: 0709-0940
Client Sample ID: PB-849-LINE-4
Sample Matrix: Solid

Date Sampled: 09/04/2007
Date Received: 09/07/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	86	N/A	%	DAB	09/10/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(a)anthracene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(a)pyrene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(b)fluoranthene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Benzo(ghi)perylene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Chrysene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Fluorene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Phenanthrene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330
Pyrene	8270C(1)	<380	380	ug/kg	SPL	09/24/2007	0065131-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<5.8	5.8	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Cumene	8260B(1)	<5.8	5.8	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Ethylbenzene	8260B(1)	<5.8	5.8	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Naphthalene	8260B(1)	<5.8	5.8	ug/kg	JEC	09/13/2007	0065141-1	<5.0
Toluene	8260B(1)	<5.8	5.8	ug/kg	JEC	09/13/2007	0065141-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of 1041382

Section A Required Client Information

Company	
Address	
Email To	
Phone	Fax
Requested Due Date/TAT:	

Section B Required Project Information

Report To:	
Copy To:	
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

NPDES, GROUND WATER, DRINKING WATER, UST, RCRA, Other _____

SITE LOCATION

GA, IL, IN, MI, MN, NC, OH, SC, WI, OTHER _____

Section D Required Client Information

SAMPLE ID

One Character per box (A-Z, 0-9 / -)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE; DRINKING WATER / DW; WATER / WT; WASTE WATER / WW; PRODUCT / P; SOIL/SOLID / SL; OIL / OL; WIPE / WP; AIR / AR; OTHER / OT; TISSUE / TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	Requested Analysis:	Residual Chlorine (Y/N)	Pace Project Number / Lab I.D
1	PC-247-Line-1	SL	G			[illegible]	1100		5	X						X	X		X		09-0937
2	PC-247-Line-2	SL	G			[illegible]	1110		5	X						X	X		X		38
3	PC-247-Line-3	SL	G			[illegible]	1120		5	X						X	X		X		39
4	PC-247-Line-4	SL	G			[illegible]	1130		5	X						X	X		X		40
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
US Cargo			[signature] Pace-Pgh	9/7/07	0955

SAMPLE CONDITION

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
14	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [signature]

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY)

SEE REVERSE SIDE FOR INSTRUCTIONS

APPENDIX B

PADEP Aboveground Storage Tank System Closure Report Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 117A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51-19781

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water N/A feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. **TANK SYSTEM REMOVED FROM THE GROUND/SITE**

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

D. **TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE**

Was obvious contamination observed during sampling, boring or assessing water depths?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

E. If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, John Burchette (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

10-10-07
Date

Staff Geologist
Title of Person Performing Site Assessment

SECOR International, Inc.
Name of Company Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Sample/Analysis Information (Attachment for Section III.)

Facility ID Number 51-19781

Sample I.D. (See diagram)	Parameter	Analytical Method[1]		Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
see Table 1								

[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: 51 - 19781

County: Philadelphia

Township/Borough: Philadelphia

See FIGURE 1 and FIGURE 2

PB 846

S. Morescalchi

SECOR

SECOR INTERNATIONAL INCORPORATED
www.secor.com

July 22, 2003

Mr. Jim Tucker
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank #846 Site Assessment Report**
Sunoco Philadelphia Refinery, Philadelphia, Pennsylvania

Dear Mr. Tucker:

This letter summarizes the site assessment activities that were conducted in the vicinity of aboveground storage tank (AST) 846. The project site is located within the Sunoco, Inc. (Sunoco) Philadelphia Refinery located in Philadelphia, Pennsylvania (**Figure 1**). Site assessment activities were conducted to evaluate the vertical and lateral extent of impacted soil resulting from a product release that occurred during May 2002. Surface soils within the containment dike are visibly stained in some areas and a shallow (approximately 1 foot deep) trench was excavated around the perimeter of the AST to collect the product. Soil borings were advanced in order to evaluate the extent of impacted soil as well as to collect soil samples for laboratory analyses. In addition, temporary well points were installed in order to detect the presence of light non-aqueous phase liquids (LNAPL) on the water table surface

Soil Boring Installation and Soil Sampling

Soil borings were advanced in the vicinity of AST 846 on May 28 and 29, 2003 by B.L. Myers using a truck-mounted direct-push drilling rig (Geoprobe®-type). The borings were advanced under the supervision of a SECOR International Incorporated (SECOR) Professional Geologist certified in Pennsylvania.

12 soil borings (GP-1 through GP-8 and MW-1 through MW-4) were installed in the corners of the dike containment area and adjacent to the trench surrounding AST 846. 25 soil samples were collected from the 12 soil borings. In addition, one surface soil sample (GP-9 (Surface)) was collected from the upper 0.3

feet of the visibly stained soil surrounding AST 846. Soil boring locations are depicted on **Figure 2**. Due to a recent rainfall, the northeast and northwest corners of the dike containment area were not accessible because the ground was too soft to support the weight of the drill rig. Borings at these locations were placed as close as possible to the corners. Soil borings were also not placed in the trench surrounding AST 846 because the trench was full of water from the recent rainfall.

Soil samples were collected from 0 to 2 feet below ground surface (bgs) and from a half-foot interval above the water table in each boring except for GP-9 (Surface), which was a soil sample collected from the upper 0.3 feet of the visibly stained soil, and MW-2 where only a surface sample was collected because the boring collapsed at approximately 2 to 2.5 feet bgs. In addition, a third soil sample was collected from GP-7 (6.5-7) due to the presence of black sandy silt with an elevated PID reading. After collection, the soil samples were placed in appropriate laboratory containers, labeled, placed in an ice-chilled cooler and logged on a chain-of-custody form. The soil samples were delivered to Washington Group Environmental Services Laboratory of Boothwyn, Pennsylvania for analysis.

Observations recorded during soil boring installation are recorded on soil boring logs included in **Appendix A**. The soil boring logs include lithologic descriptions of material encountered and relative soil volatile organic vapor content based on photoionization detector (PID) readings. As indicated on the boring logs, the materials encountered were largely silt, sand, and fill material. Except for GP-7 (6.5-7), no stained soils were observed at depth (below a depth of approximately a few inches bgs). Groundwater was encountered at approximately 15-16 feet bgs in the borings.

Temporary Well Point Installation

Temporary well points were installed at boring locations MW-1, MW-3 and MW-4. The well points were constructed of 1¼ inch PVC. A temporary well point could not be installed at MW-2 because the boring collapsed at approximately 2 to 2.5 feet bgs and would not stay open. Well construction details are presented on the soil boring logs in **Appendix A.**

Laboratory Analyses of Soil Samples

The laboratory analyses selected for each the soil sample were based on the content of the AST. AST 846 was reported to contain crude oil. As a result, each soil sample was analyzed for Pennsylvania Department of Environmental Protection (PADEP) Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil #4, #5 #6, and Lubricating Oils and Fluids in soils. The list includes the analyses of benzene and naphthalene by EPA Method 5035/8260B and fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(g,h,i) perylene by EPA Method 8270C.

For quality assurance/quality control (QA/QC) purposes, a trip blank accompanied the sample shipment for the analysis of benzene and naphthalene by EPA Method 5035/8260B.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix B.** The analytical results for the soil samples were compared to the cleanup criteria established by for PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. Soil samples GP-1 (15-15.5), GP-2 (15-15.5), GP-3 (15-15.5), GP-4 (15-15.5), GP-5 (15-15.5), GP-6 (15.5-16), GP-7 (6.5-7), GP-8 (7.5-8), GP-8 (15-15.5), MW-1 (11.5-12), MW-3 (11.5-12) and MW-4 (11.5-12) did not exceed any Used Aquifer Nonresidential Soil-to-Groundwater MSCs. The following soil samples exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs:

- GP-1 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 2,000 micrograms per kilogram (ug/kg), 2,200 ug/kg, 1,800 ug/kg, 670 ug/kg and 1,800 ug/kg, respectively.
- GP-2 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 5,000 ug/kg, 4,800 ug/kg, 3,800 ug/kg, 1,700 J ug/kg and 4,400 ug/kg, respectively.
- GP-3 (0-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 1,600 ug/kg, 1,400 ug/kg, 1,100 ug/kg, 410 J ug/kg and 1,400 ug/kg, respectively.
- GP-4 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 4,100 ug/kg, 3,500 ug/kg, 3,200 ug/kg, 1,200 J ug/kg and 4,000 ug/kg, respectively.

- GP-5 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 2,100 ug/kg, 2,300ug/kg, 1,800 ug/kg, 880 J ug/kg and 2,000 ug/kg, respectively.
- GP-6 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 2,700 ug/kg, 2,300ug/kg, 2,000 ug/kg, 770 J ug/kg and 2,400 ug/kg, respectively.
- GP-7 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for benzo(b)fluoranthene with a concentration of 1,300 ug/kg.
- GP-7 (15.5-16) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for naphthalene with a concentration of 25,000 ug/kg.
- GP-8 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for naphthalene with a concentration of 40,000 ug/kg.
- GP-9 (Surface) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for pyrene with a concentration of 37,000 ug/kg.
- MW-1 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 2,100 ug/kg, 1,900 ug/kg, 2,000 ug/kg, 710 ug/kg and 2,100 ug/kg, respectively.
- MW-2 (0-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 730 ug/kg, 800 ug/kg, 690 ug/kg, 370 J ug/kg and 730 ug/kg, respectively.
- MW-3 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene and chrysene with concentrations of 2,700 ug/kg, 5,000 D ug/kg, 3,900 ug/kg, 1,800 J ug/kg and 2,500 ug/kg, respectively.

Figure 3 graphically depicts soil sample results that were reported above an MSC.

Well Gauging Results

Temporary well points MW-1, MW-3 and MW-4 were gauged on June 20, 2003 for the presence of LNAPL. LNAPL was detected in MW-3 at a thickness of 0.89 feet. Well gauging results are summarized on **Table 2**.

Conclusions

The soil sampling results indicate that the Used Aquifer Nonresidential Soil-to-Groundwater MSCs were exceeded in all surface soil samples (depths of 0 to 2 feet bgs). Used Aquifer Nonresidential Soil-to-Groundwater MSCs were exceeded in soil samples which were not visibly stained, including soil samples collected in the corners of the diked area which appear to be unaffected by the May 2002 release. Therefore, the exceedance of the Used Aquifer Nonresidential Soil-to-Groundwater MSCs may potentially be associated with the fill material rather than the May 2002 release. Where present, the visually impacted soil was limited to a few inches in depth.

LNAPL has been detected in existing monitoring wells (monitoring wells S-34 and S-35) installed at a former AST location immediately south of AST 846. Although LNAPL was detected in MW-3 in the vicinity of AST 846, it is likely that this LNAPL may be associated with an existing LNAPL plume unrelated to AST 846 since soil samples collected immediately above the water table were below the Used Aquifer Nonresidential Soil-to-Groundwater MSCs (with the exception of GP-7 (15.5-16)).

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

Sincerely,
SECOR International Incorporated

Sergio Morescalchi
Staff Geologist

Steve Baggett, P.G.
Principal Hydrogeologist

c: James Oppenheim (Sunoco)
Al Hornung (Sunoco)
Project File

S:\Clients\Sunoco\AST Investigations\AST 846\846 SAR.doc

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	MW-4(1.5-2)	MW-4(11.5-12)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/29/03	05/29/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs					
Benzene	54 J	ND (250)	210,000	240,000	500
Naphthalene	75 J	ND (250)	56,000,000	190,000,000	10,000
SVOCs					
Anthracene	330 J	ND (410)	190,000,000	190,000,000	6,600
Benzo(a)anthracene	**930**	ND (410)	110,000	190,000,000	360
Benzo(a)pyrene	**1,100**	ND (410)	11,000	190,000,000	20
Benzo(b)fluoranthene	**980**	ND (410)	110,000	190,000,000	120
Benzo(ghi)perylene	**500**	ND (410)	170,000,000	190,000,000	26
Chrysene	**910**	ND (410)	11,000,000	190,000,000	190
Fluorene	ND (390)	ND (410)	110,000,000	190,000,000	190,000
Phenanthrene	1,200	ND (410)	190,000,000	190,000,000	110,000
Pyrene	1,100	260 J	84,000,000	190,000,000	13,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

BOLD = Exceeds Soil to Groundwater MSC

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 2
Well Gauging Data
June 20, 2003

AST 846
Sunoco Philadelphia Refinery

Well	Depth To		LNAPL Thickness (Feet)
	LNAPL (Feet)	Water (Feet)	
MW-1	ND	13.01	--
MW-3	16.94	17.83	0.89
MW-4	ND	4.22	--

NOTES:

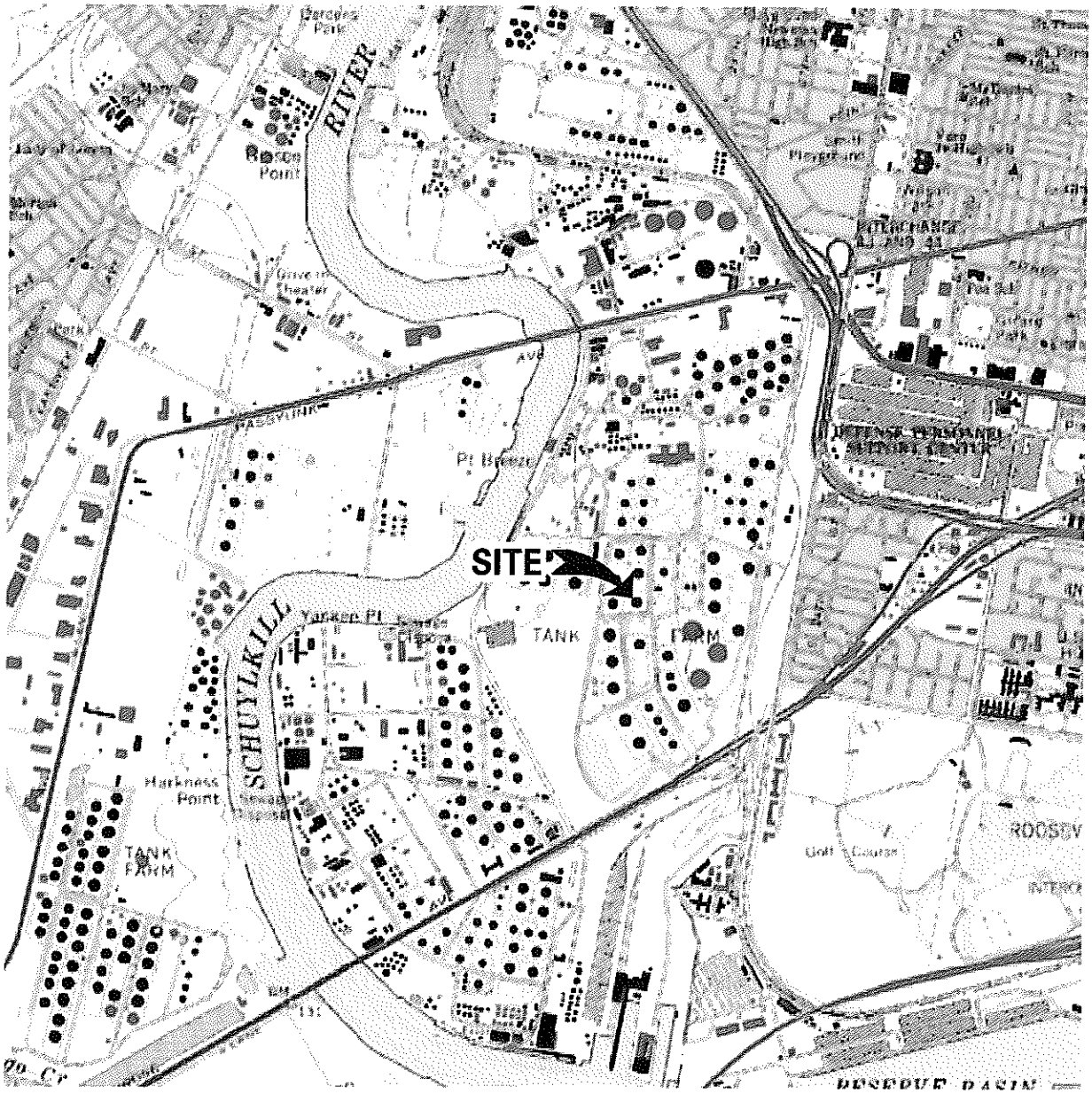
LNAPL = Light Nonaqueous phase liquid

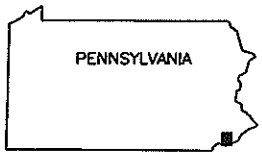
ND = No LNAPL detected

MW-4 was in a pool of standing water

Depth to water in MW-4 is above the screened-interval

S:\Clients\Sunoco\AST Investigations\AST 846\[well gauging data.xls]june 20, 20





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
International Incorporated
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA 19341
(484) 875-3075/875-9286 (FAX)

SITE LOCATION MAP

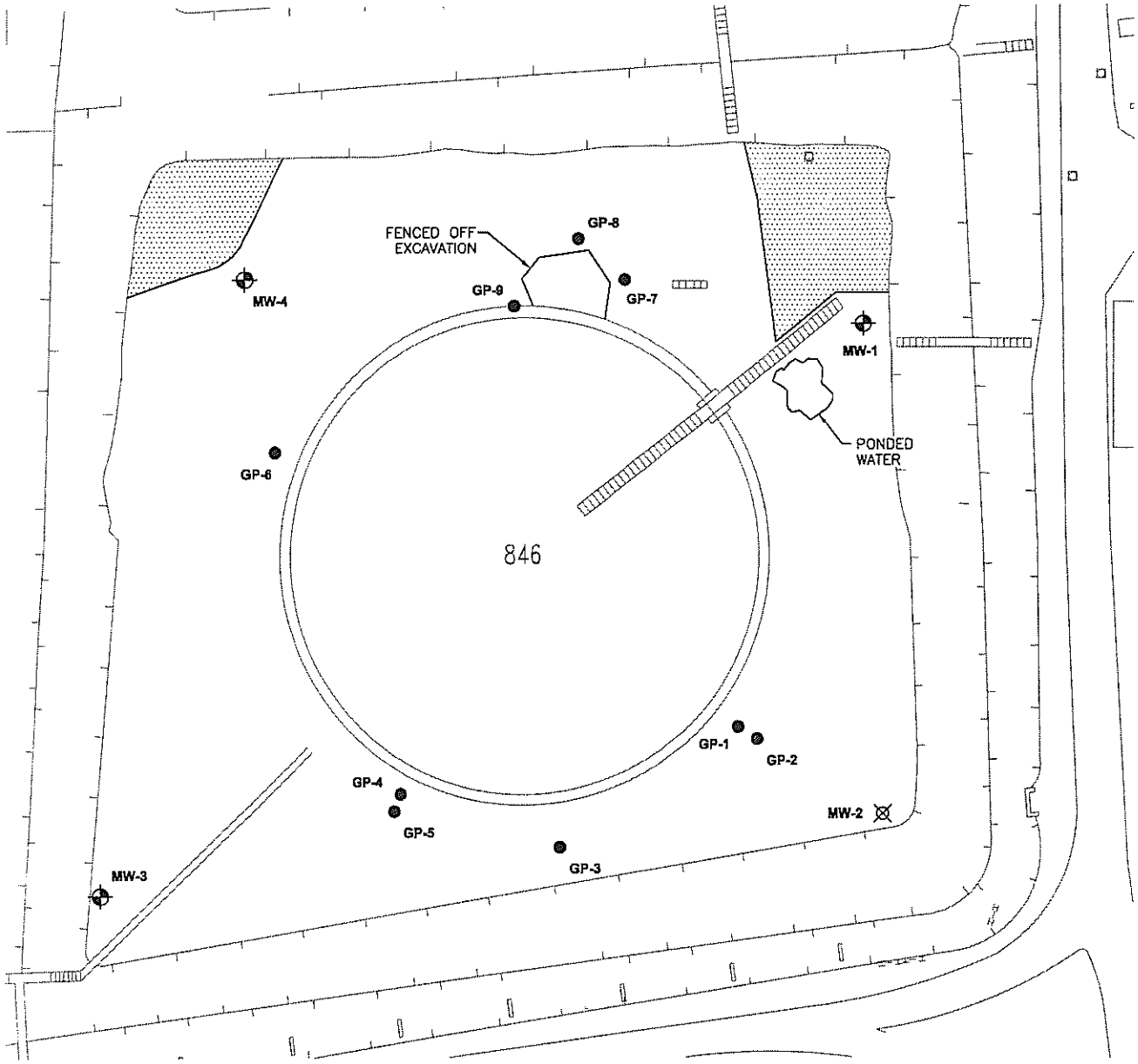
SUNOCO PHILADELPHIA REFINERY PROJECT
PHILADELPHIA, PENNSYLVANIA

FIGURE: **1**

JOB#: 62SU.01017.02 APPR: DWN: KPM DATE: 07/03/03

N:/OFFICE-062

DWG: 62SU-1017-2-61(AST846)



LEGEND

- GEOPROBE BORING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- GEOPROBE BORING – MONITORING WELL NOT INSTALLED
- GROUND TOO SOFT TO ACCESS

N

0 50 100

APPROXIMATE SCALE (FEET)

REFERENCE: HANDEX ENVIRONMENTAL RECOVERY, INC.; PROJECT 110535-12; DRAWINGNAME: PB_SY_05.DWG; TITLE: SOUTH YARD BASE MAP; DATE: 05/21/96

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International Incorporated
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(484) 875-3075/875-9286 (FAX)

AST 846 GEOPROBE BORING AND MONITORING WELL LOCATIONS

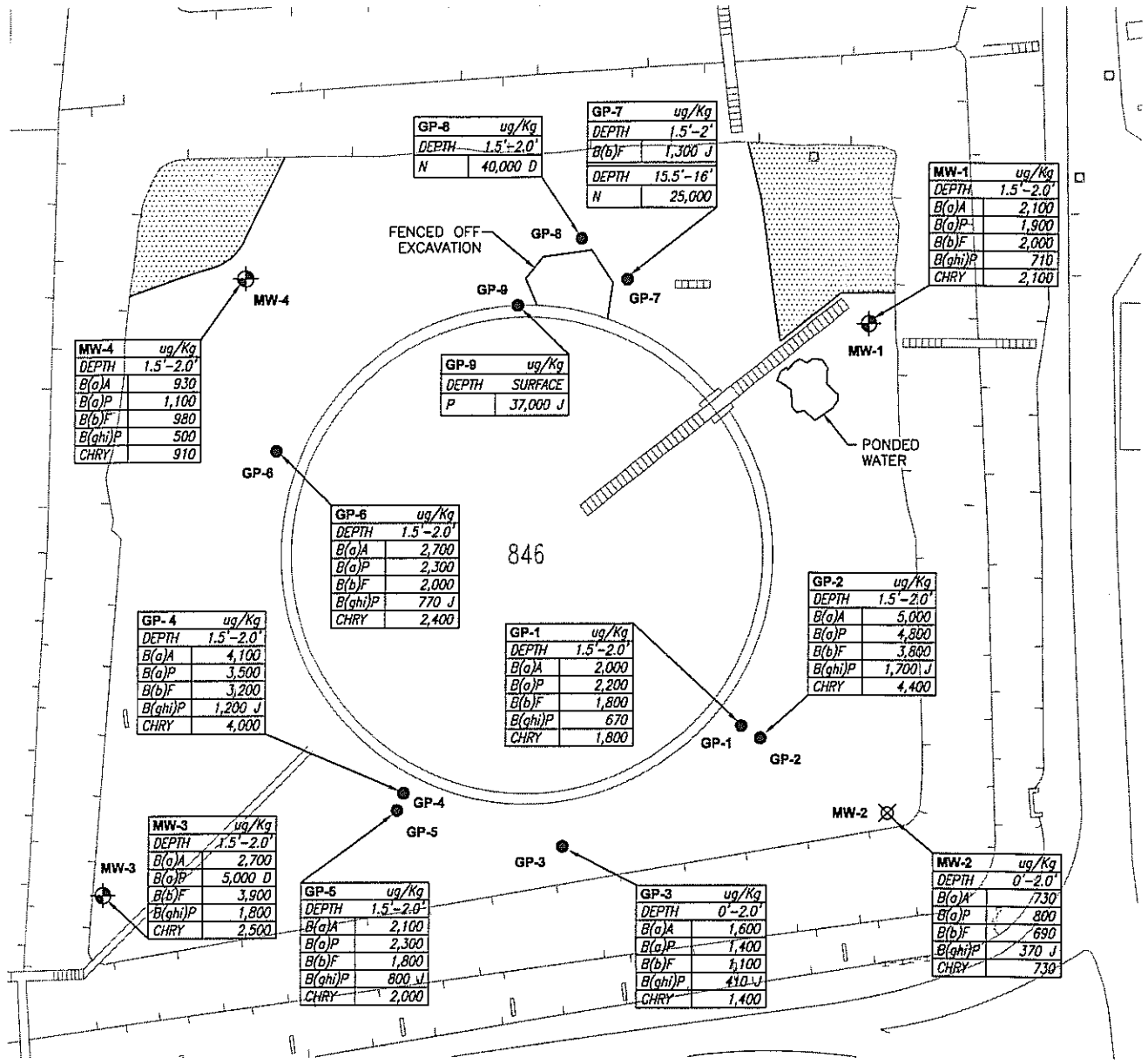
SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

FIGURE: **2**

JOB#: 62SU.01017.02.0006 APPR: DWN: KPM DATE: 06/17/03

N:/SECOR-062

DWG: 62SU-1017-2-62(AST486)



LEGEND

- GEOPROBE BORING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- GEOPROBE BORING – MONITORING WELL NOT INSTALLED
- GROUND TOO SOFT TO ACCESS

NOTE

ONLY SAMPLES EXCEEDING MSCs ARE PRESENTED

N

0 50 100

APPROXIMATE SCALE (FEET)

	ANALYTE	NONRESIDENTIAL SOIL-TO-GROUNDWATER USED AQUIFER MSC (ug/Kg)
N	NAPHTHALENE	10,000
B(a)A	BENZO(a)ANTHRACENE	360
B(a)P	BENZO(a)PYRENE	20
B(b)F	BENZO(b)FLUORANTHENE	120
B(ghi)P	BENZO(ghi)PYRYLENE	26
CHRY	CHRYSENE	190
P	PYRENE	13,000

D RESULT WAS OBTAINED FROM A DIFFERENT DILLUTION THAN THE OTHER ANALYTES

J ESTIMATED VALUE

REFERENCE: HANDEX ENVIRONMENTAL RECOVERY, INC.; PROJECT 110535-12; DRAWINGNAME: PB_SY_05.DWG; TITLE: SOUTH YARD BASE MAP; DATE: 05/21/96

SECOR International Incorporated
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA 19341
(484) 875-3075/875-9286 (FAX)

AST 846 GEOPROBE BORING SOIL ANALYTICAL RESULTS MAP (MAY 28-29, 2003)

SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

FIGURE: **3**

JOB#: 62SU.01017.02.0006 APPR: DWN: KPM DATE: 07/03/03

N:/SECOR-062

DWG: 62SU-1017-2-63A(AST486)

APPENDIX A

Soil Boring Logs

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-1**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		CLAY and SAND, fine to coarse; some fine gravel, brown (black at top), moist.	4.0	69.5
		Piece of BRICK.		0.0
		SILT and SAND, fine to coarse; dark brown, moist.		0.0
		SILT and SAND, fine to coarse; trace fine gravel, dark brown, moist.		0.0
				0.0
		SILT; little fine to coarse sand, piece of brick, dark gray, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.	3.5	0.0
5		Piece of QUARTZ.		0.0
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		0.0
		SAND, fine; some medium to coarse sand, little fine gravel, brown, dry.		0.0
		SAND, fine; some silt, little medium to coarse sand, brown, dry.	3.5	0.0
		SAND, fine; little medium to coarse sand, little silt, brown, dry.		0.0
		SAND, fine to coarse; little fine gravel, brown and red, dry.		0.0
10				
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.	4.0	19.7
				9.5
				0.0
		SAND, fine; trace medium to coarse sand, brown, dry.		53.4
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		74.5
15				130
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, wet.		171
				252
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-2**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		GRAVEL, fine and SILT; little medium to coarse sand, brown, moist.	3.0	0.0
		SAND, fine; some silt, little medium to coarse sand, trace fine gravel, dark brown and black, dry.		0.0
		SAND, fine; little silt, little medium to coarse sand, trace fine gravel, dark brown, dry.		0.0
				0.0
		SILT; some fine to coarse sand, dark brown, dry.		0.0
				6.2
		SILT; trace fine sand, light gray, dry.	3.0	0.0
		SAND, fine; trace medium sand, brown, dry.		0.0
5		SAND, fine; little medium to coarse, trace fine gravel, brown, dry.		0.0
				0.0
		SAND, fine; trace medium to coarse sand, reddish brown, dry.		0.0
		SAND, fine; some medium to coarse sand, little silt, reddish brown, dry.		0.0
		SAND, fine to coarse; little fine gravel, brown, dry.	3.0	5.1
				0.0
10				0.0
				6.8
				9.2
			3.0	0.0
		SAND, fine; little medium to coarse sand, brown, dry.		6.1
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.		18.6
				75.1
15				187
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, wet.		243
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-3**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; some fine to coarse sand, little fine gravel, brown, moist.	3.0	0.0
		GRAVEL, fine; little fine to coarse sand, gray, dry.		0.0
		SILT and SAND, fine; some medium to coarse sand, dark gray, dry.		0.0
		SILT; some fine to coarse sand, trace fine gravel, dark brown, dry.		0.0
				0.0
		SILT; little fine to coarse sand, trace fine gravel, dark brown, dry.		0.0
		SAND, fine; trace medium to coarse sand, brown, dry.	3.0	0.0
		SAND, fine; some medium to coarse, little fine gravel, brown, dry.		0.0
5		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
				0.0
				0.0
			4.0	5.1
		SAND, fine to coarse; little fine gravel, trace coarse gravel, brown, dry.		0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
10				0.0
				0.0
				0.0
		SAND, fine and SAND, medium to coarse; trace fine gravel, brown, dry.	3.0	0.0
				0.0
				0.0
				0.0
				36.5
15				231
		SAND, fine and SAND, medium to coarse; trace fine gravel, brown, dry (wet at bottom).		331
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-4**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; little fine sand, trace medium to coarse sand, brown, moist.	3.5	0.0
		SAND, fine; some silt, some medium to coarse sand, dark brown, moist.		0.0
		SILT; little medium to coarse sand, dark brown, moist.		0.0
		SILT; little medium to coarse sand, dark gray, dry.		0.0
		SILT; little fine to coarse sand, dark gray, dry.		0.0
		SILT; little fine to coarse sand, brown, dry.		0.0
				0.0
		SILT; some clay, little fine sand, brown, moist.	2.0	0.0
5				
		SAND, fine; brown, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SAND, fine to coarse; some fine gravel, brown, dry.	3.0	0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
10				6.3
				8.6
				0.0
		SAND, fine to coarse; some silt, brown, dry.	3.0	0.0
				0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
15				98.1
		SAND, fine; some medium to coarse sand, brown, wet.		338
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-5**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; some fine to coarse sand, little fine gravel, brown, wet.	3.0	0.0
		SILT; some fine to coarse sand, little fine gravel, pieces of brick, brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
		SILT; little fine sand, little clay, light gray, dry.		0.0
		SILT; little fine sand, little clay, trace fine sand, light gray, dry.		0.0
		SILT; little clay, little fine sand, trace medium to coarse sand, brown, moist.	3.5	0.0
5				0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.		0.0
		SAND, fine and SAND, medium to coarse; some fine gravel, light brown, dry.		0.0
				0.0
		SAND, fine to coarse; some fine gravel, reddish brown, dry.	3.0	0.0
				0.0
10				0.0
				0.0
				0.0
			2.0	14.8
				5.0
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		90.8
15		SAND, fine; trace medium to coarse sand, brown, wet.		318
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-6**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT and SAND, fine; some medium to coarse sand, brown, moist.	3.0	0.0
		SILT; some fine to coarse sand, brown, dry.		13.5
		SILT and BRICK; little fine to coarse sand, brown, dry.		7.7
		SILT; little fine to coarse sand, brown, dry.		5.0
		SILT; some fine sand, little medium to coarse sand, brown, dry.		0.0
				0.0
		SAND, fine; little medium to coarse sand, pieces of brick, brown, dry.	3.5	7.6
5				0.0
		SILT; some fine to coarse sand, pieces of brick, dark gray, dry.		0.0
		SILT; some fine sand, little clay, brown, dry.		0.0
				0.0
				0.0
				0.0
		SILT; little fine sand, brown, dry.	4.0	0.0
		SILT; little fine sand, dark gray, dry.		0.0
10		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
				0.0
		SILT; some fine sand, trace medium sand, brown, dry.	3.0	0.0
		CLAY; little silt, little fine sand, brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
15		SILT; little fine sand, gray and brown, dry.		0.0
				0.0
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/29/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	GP-7

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SAND, fine; trace medium to coarse sand, brown, moist.	3.5	0.0
		SILT; little medium to coarse sand, brown, dry.		0.0
		BRICK.		0.0
		WOOD.		0.0
		SILT; little fine sand, brown, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SILT; some medium to coarse sand, piece of brick, brown, dry.	3.0	0.0
5		SILT; some medium to coarse sand, brown, dry.		0.0
				0.0
		SILT; some medium to coarse sand, black, dry.		0.0
				38.4
				15.5
				12.4
			4.0	5.1
		SILT; little fine sand, brown, dry.		0.0
				0.0
10		SILT; little fine sand, orange brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
		SILT; some fine to coarse sand, brown, wet.	4.0	0.0
		SILT; some fine to coarse sand, brown, dry.		0.0
				0.0
				0.0
15				0.0
		SAND, fine; little silt, little medium to coarse sand, brown, dry.		0.0
		SAND, fine; little silt, little medium to coarse sand, brown, dry (wet at bottom).		113
				155
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-8**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; little fine to coarse sand, brown, dry.	2.5	132
				62.9
				13.0
		SILT; little fine to coarse sand, little fine gravel, gray, dry.		0.0
				0.0
		CLAY; some silt, little fine to coarse sand, brown, moist.	4.0	20.1
				30.7
5				18.5
				24.4
		SILT and SAND, fine to coarse; black, dry.		13.8
				10.5
				37.7
		SILT; some fine to coarse sand, brown, dry.	4.0	40.1
				0.0
		SILT and SAND, fine to coarse; black, moist.		0.0
				20.8
10		SILT; little fine to coarse sand, black and brown, moist.		10.2
		SILT; little fine to coarse sand, brown, moist.		5.6
		SILT; some clay, little fine to coarse sand, brown, dry.		0.0
		CLAY; some silt, trace fine sand, brown, dry.	3.0	0.0
		SILT; little fine sand, gray and dark brown, dry.		0.0
				0.0
				0.0
				0.0
15		SAND, fine; some medium to coarse sand, little silt, trace fine gravel, dark brown, dry.		20.7
		SAND, fine; little medium to coarse sand, brown, moist.		131
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**		**GP-9**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				0.3		

Depth, (ft.)	Sample Type	Description
		Surface sample.
5		
10		
15		
20		

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-1**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): **20.0**	Casing Length (ft):	Screen Length (ft):

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT; little fine sand, trace medium to coarse sand, brown, moist.	4.0	0.0
			SILT; little fine sand, trace medium to coarse sand, piece of brick, brown, dry.		0.0
			SILT; little fine sand, trace medium to coarse sand, piece of brick, black and dark gray, dry.		0.0
					0.0
			SILT; little fine sand, trace medium to coarse sand, trace fine gravel, piece of brick, black and dark gray, dry.		0.0
					0.0
			SILT; trace fine sand, gray, dry.		0.0
			CLAY; some silt, trace fine sand, brown, moist.	3.0	0.0
	5		SILT; some clay, trace fine sand, brown, moist.		0.0
			SILT; trace clay, trace fine sand, brown, moist.		0.0
					0.0
			SILT; some fine sand, brown, moist.		0.0
					0.0
			SAND, fine to coarse; little fine gravel, red and brown, dry.	2.0	0.0
					0.0
	10				0.0
					0.0
			SAND, fine to coarse; little silt, reddish brown, wet.	4.0	0.0
					0.0
					0.0
					0.0
					0.0
	15		SAND, fine to coarse; little fine gravel, reddish brown, wet.		7.6
					150
			SAND, fine; some medium to coarse sand, reddish brown, wet.		341
			SAND, fine to coarse; little fine gravel, little silt, brown, wet.	3.0	92.5
					182
					316
					244
					126
	20				58.8

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-2**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): **12.5**	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT and SAND, fine to coarse; some fine gravel, brown, moist.	2.0	0.0
		CLAY; little silt, little fine sand, gray, dry.		0.0
		SILT; little clay, little fine sand, gray, dry.		0.0
		SAND, fine; little silt, gray, dry.		0.0
		SAND, fine; trace medium to coarse sand, trace fine gravel, dry.	3.0	0.0
5				0.0
				0.0
		SAND, fine; some fine gravel, trace medium to coarse sand, dry.		0.0
		SAND, fine to coarse; little silt, reddish brown, dry.		0.0
				0.0
		SAND, fine to coarse; little silt, brown, wet.	3.0	0.0
				0.0
10				0.0
		SAND, fine to coarse; trace fine gravel, reddish brown, moist.		0.0
				0.0
		SAND, fine to coarse; little fine gravel, brown, moist.	.5	0.0
15		Boring collapsed at 2.5 feet below grade. Could not keep boring open. Could not set well.		
20				

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-3**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): **20.0**	Casing Length (ft):	Screen Length (ft):

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT and SAND, fine to coarse; brown, moist.	4.0	0.0
			SILT; little fine sand, trace medium to coarse sand, brown, dry.		0.0
					0.0
					0.0
					0.0
			SILT; little fine sand, little medium to coarse sand, dark brown and black, dry.		0.0
					0.0
			SILT; some fine sand, little medium to coarse sand, black, dry.	4.0	14.3
					45.7
	5		SILT; little fine sand, dark brown, dry.		32.5
			SILT; little fine sand, brown, dry.		0.0
					0.0
					0.0
			SILT; little fine sand, dark brown and gray, dry.		0.0
			SILT; some fine sand, dark brown and gray, dry.		0.0
			CLAY; little fine sand, brown, dry.	2.5	0.0
					0.0
					0.0
	10				0.0
			SAND, fine to coarse; little fine gravel, red and brown, dry.		0.0
					0.0
				3.5	0.0
					0.0
					7.6
					21.6
	15				152
					300
			SAND, fine to coarse; little fine gravel, red and brown, wet.	3.0	415
					700
			SAND, fine; little medium to coarse sand, reddish brown, wet.		619
					311
					298
	20				316

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/29/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	MW-4

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): 16.0	Casing Length (ft):	Screen Length (ft):

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT; some fine sand, little medium to coarse sand, brown, moist.	3.5	13.3
			SILT; some fine to coarse sand, pieces of brick, brown, dry.		15.6
					17.9
					9.1
					0.0
			CLAY; some silt, little fine sand, dark gray, dry.		0.0
					5.1
			CLAY; some silt, little fine sand, dark gray, wet.	2.0	0.0
	5		SILT; some clay, some fine to coarse sand, gray, wet.		0.0
					0.0
					0.0
			SILT; some clay, some fine to coarse sand, pieces of brick, gray, wet.	3.0	0.0
					0.0
					0.0
	10				0.0
			CLAY; little silt, little fine to coarse sand, gray, dry.		0.0
			SILT; some clay, little fine sand, gray, dry.		0.0
			NO RECOVERY 12-16 feet.	0.0	
	15				
	20				

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

APPENDIX B

Laboratory Analytical Reports

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310177A	GP-1(1.5-2)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310177A	GP-1(1.5-2)	G01PA	Naphthalene	200 J	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310177B	GP-1(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310177B	GP-1(1.5-2)	G10PA	Anthracene	500	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benz(a)anthracene	2000	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(a)pyrene	2200	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(b)fluoranthene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(ghi)perylene	670	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Chrysene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Fluorene	ND	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Phenanthrene	1700	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Pyrene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	S06	WATER BY EVAP	16.3		% as received	05/28/03	06/11/03	06/11/03	MJS
310178A	GP-1(15-15.5)	G01PA	Benzene	110 J	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310178A	GP-1(15-15.5)	G01PA	Naphthalene	3700	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310178B	GP-1(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310178B	GP-1(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Fluorene	400	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Phenanthrene	990	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	S06	WATER BY EVAP	7.3		% as received	05/28/03	06/11/03	06/11/03	MJS
310179A	GP-2(1.5-2)	G01PA	Benzene	ND	230	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310179A	GP-2(1.5-2)	G01PA	Naphthalene	720	230	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310179B	GP-2(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310179B	GP-2(1.5-2)	G10PA	Anthracene	ND	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benz(a)anthracene	5000	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benzo(a)pyrene	4800	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benzo(b)fluoranthene	3800	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310179B	GP-2(1.5-2)	G10PA	Benzo(ghi)perylene	1700 J	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Chrysene	4400	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Fluorene	ND	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Phenanthrene	2100	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Pyrene	5400	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	S06	WATER BY EVAP	8.5		% as received	05/28/03	06/11/03	06/11/03	MJS
310180A	GP-2(15-15.5)	G01PA	Benzene	ND	260	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310180A	GP-2(15-15.5)	G01PA	Naphthalene	2200	260	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310180B	GP-2(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310180B	GP-2(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Fluorene	200 J	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Phenanthrene	480	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	S06	WATER BY EVAP	6.9		% as received	05/28/03	06/11/03	06/11/03	MJS
310181A	GP-3(0-2)	G01PA	Benzene	ND	310	ug/kg-dry	05/28/03	06/05/03	06/05/03	WJD
310181A	GP-3(0-2)	G01PA	Naphthalene	ND	310	ug/kg-dry	05/28/03	06/05/03	06/05/03	WJD
310181B	GP-3(0-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310181B	GP-3(0-2)	G10PA	Anthracene	310 J	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benz(a)anthracene	1600	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(a)pyrene	1400	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(b)fluoranthene	1100	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(ghi)perylene	410 J	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Chrysene	1400	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Fluorene	ND	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Phenanthrene	1100	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Pyrene	2000	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	S06	WATER BY EVAP	20.4		% as received	05/28/03	06/11/03	06/11/03	MJS
310182A	GP-3(15-15.5)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310182A	GP-3(15-15.5)	G01PA	Naphthalene	420	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310182B	GP-3(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310182B	GP-3(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Fluorene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Phenanthrene	350 J	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	S06	WATER BY EVAP	6.6		% as received	05/28/03	06/11/03	06/11/03	MJS
310183A	GP-4(1.5-2)	G01PA	Benzene	ND	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310183A	GP-4(1.5-2)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310183B	GP-4(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310183B	GP-4(1.5-2)	G10PA	Anthracene	1900 J	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benz(a)anthracene	4100	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(a)pyrene	3500	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(b)fluoranthene	3200	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(ghi)perylene	1200 J	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Chrysene	4000	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Fluorene	ND	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Phenanthrene	10000	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Pyrene	7300	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	S06	WATER BY EVAP	14.5		% as received	05/28/03	06/11/03	06/11/03	MJS
310184A	GP-4(15-15.5)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310184A	GP-4(15-15.5)	G01PA	Naphthalene	240 J	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310184B	GP-4(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310184B	GP-4(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB

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310184B	GP-4(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Fluorene	270 J	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Phenanthrene	690	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	S06	WATER BY EVAP	9.7		% as received	05/28/03	06/11/03	06/11/03	MJS
310185A	GP-5(1.5-2)	G01PA	Benzene	ND	310	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310185A	GP-5(1.5-2)	G01PA	Naphthalene	ND	310	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310185B	GP-5(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310185B	GP-5(1.5-2)	G10PA	Anthracene	610 J	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benz(a)anthracene	2100	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(a)pyrene	2300	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(b)fluoranthene	1800	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(ghi)perylene	880 J	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Chrysene	2000	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Fluorene	ND	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Phenanthrene	1900	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Pyrene	2400	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	S06	WATER BY EVAP	29.8		% as received	05/28/03	06/11/03	06/11/03	MJS
310186A	GP-5(15-15.5)	G01PA	Benzene	140 J	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310186A	GP-5(15-15.5)	G01PA	Naphthalene	370	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310186B	GP-5(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310186B	GP-5(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Fluorene	250 J	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Phenanthrene	660	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	S06	WATER BY EVAP	9.7		% as received	05/28/03	06/11/03	06/11/03	MJS
310187A	GP-6(1.5-2)	G01PA	Benzene	ND	270	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310187A	GP-6(1.5-2)	G01PA	Naphthalene	130 J	270	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS

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310187B	GP-6(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310187B	GP-6(1.5-2)	G10PA	Anthracene	1300	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benz(a)anthracene	2700	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(a)pyrene	2300	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(b)fluoranthene	2000	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(ghi)perylene	770 J	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Chrysene	2400	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Fluorene	500 J	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Phenanthrene	4700	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Pyrene	3600	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	S06	WATER BY EVAP	14.1		% as received	05/28/03	06/11/03	06/11/03	MJS
310188A	GP-6(15.5-16)	G01PA	Benzene	ND	260	ug/kg-dry	05/28/03	06/07/03	06/07/03	PSS
310188A	GP-6(15.5-16)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/28/03	06/07/03	06/07/03	PSS
310188B	GP-6(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310188B	GP-6(15.5-16)	G10PA	Anthracene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benz(a)anthracene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(a)pyrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(ghi)perylene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Chrysene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Fluorene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Phenanthrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Pyrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	S06	WATER BY EVAP	20		% as received	05/28/03	06/11/03	06/11/03	MJS
310189A	GP-7(1.5-2)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310189A	GP-7(1.5-2)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310189B	GP-7(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310189B	GP-7(1.5-2)	G10PA	Anthracene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benz(a)anthracene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(a)pyrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(b)fluoranthene	1300 J	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(ghi)perylene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Chrysene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB

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310189B	GP-7(1.5-2)	G10PA	Fluorene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Phenanthrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Pyrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	S06	WATER BY EVAP	16.6		% as received	05/29/03	06/11/03	06/11/03	MJS
310190A	GP-7(6.5-7)	G01PA	Benzene	160 J	330	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310190A	GP-7(6.5-7)	G01PA	Naphthalene	9400	330	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310190B	GP-7(6.5-7)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310190B	GP-7(6.5-7)	G10PA	Anthracene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benz(a)anthracene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(a)pyrene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(b)fluoranthene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(ghi)perylene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Chrysene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Fluorene	17000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Phenanthrene	49000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Pyrene	10000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	S06	WATER BY EVAP	29		% as received	05/29/03	06/11/03	06/11/03	MJS
310191A	GP-7(15.5-16)	G01PA	Benzene	340 J	950	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310191A	GP-7(15.5-16)	G01PA	Naphthalene	25000	950	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310191B	GP-7(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310191B	GP-7(15.5-16)	G10PA	Anthracene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benz(a)anthracene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(a)pyrene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(ghi)perylene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Chrysene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Fluorene	2200 J	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Phenanthrene	5000	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Pyrene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	S06	WATER BY EVAP	8.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310192A	GP-8(1.5-2)	G01PA	Benzene	ND	280	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310192A	GP-8(1.5-2)	G01PA	Naphthalene	40000 D	280	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310192B	GP-8(1.5-2)	,760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310192B	GP-8(1.5-2)	G10PA	Anthracene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benz(a)anthracene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(a)pyrene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(b)fluoranthene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(ghi)perylene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Chrysene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Fluorene	7600 J	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Phenanthrene	22000	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Pyrene	4100 J	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	S06	WATER BY EVAP	17.5		% as received	05/29/03	06/11/03	06/11/03	MJS
310193A	GP-8(7.5-8)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310193A	GP-8(7.5-8)	G01PA	Naphthalene	910	260	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310193B	GP-8(7.5-8)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310193B	GP-8(7.5-8)	G10PA	Anthracene	500 J	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benz(a)anthracene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(a)pyrene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(b)fluoranthene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(ghi)perylene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Chrysene	630 J	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Fluorene	820	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Phenanthrene	3400	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Pyrene	1300	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	S06	WATER BY EVAP	12.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310194A	GP-8(15-15.5)	G01PA	Benzene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310194A	GP-8(15-15.5)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310194B	GP-8(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310194B	GP-8(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Fluorene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB

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310194B	GP-8(15-15.5)	G10PA	Phenanthrene	380	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	S06	WATER BY EVAP	8.9		% as received	05/29/03	06/11/03	06/11/03	MJS
310195A	GP-9(Surface)	G01PA	Benzene	54 J	270	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310195A	GP-9(Surface)	G01PA	Naphthalene	460	270	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310195B	GP-9(Surface)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310195B	GP-9(Surface)	G10PA	Anthracene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benz(a)anthracene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(a)pyrene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(b)fluoranthene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(ghi)perylene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Chrysene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Fluorene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Phenanthrene	230000	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Pyrene	37000 J	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	S06	WATER BY EVAP	6.3		% as received	05/29/03	06/11/03	06/11/03	MJS
310196A	MW-1(1.5-2)	G01PA	Benzene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310196A	MW-1(1.5-2)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310196B	MW-1(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310196B	MW-1(1.5-2)	G10PA	Anthracene	880	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benz(a)anthracene	2100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(a)pyrene	1900	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(b)fluoranthene	2000	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(ghi)perylene	710	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Chrysene	2100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Fluorene	390	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Phenanthrene	3100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Pyrene	3200	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	S06	WATER BY EVAP	13.2		% as received	05/29/03	06/11/03	06/11/03	MJS
310197A	MW-1(11.5-12)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310197A	MW-1(11.5-12)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310197B	MW-1(11.5-12)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310197B	MW-1(11.5-12)	G10PA	Anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310197B	MW-1(11.5-12)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Chrysene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Fluorene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Phenanthrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	S06	WATER BY EVAP	8.4		% as received	05/29/03	06/11/03	06/11/03	MJS
310198A	MW-2(0-2)	G01PA	Benzene	87 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310198A	MW-2(0-2)	G01PA	Naphthalene	55 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310198B	MW-2(0-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310198B	MW-2(0-2)	G10PA	Anthracene	290 J	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benz(a)anthracene	730	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(a)pyrene	800	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(b)fluoranthene	690	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(ghi)perylene	370 J	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Chrysene	730	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Fluorene	ND	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Phenanthrene	1100	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Pyrene	1200	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	S06	WATER BY EVAP	15.1		% as received	05/29/03	06/11/03	06/11/03	MJS
310199A	MW-3(1.5-2)	G01PA	Benzene	ND	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310199A	MW-3(1.5-2)	G01PA	Naphthalene	ND	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310199B	MW-3(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310199B	MW-3(1.5-2)	G10PA	Anthracene	350 J	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benz(a)anthracene	2700	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(a)pyrene	5000 D	750	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(b)fluoranthene	3900	750	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(ghi)perylene	1800	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Chrysene	2500	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Fluorene	ND	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Phenanthrene	860	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310199B	MW-3(1.5-2)	G10PA	Pyrene	1800	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	S06	WATER BY EVAP	10.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310200A	MW-3(15.5-16)	G01PA	Benzene	65 J	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310200A	MW-3(15.5-16)	G01PA	Naphthalene	3400	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310200B	MW-3(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310200B	MW-3(15.5-16)	G10PA	Anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Chrysene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Fluorene	600	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Phenanthrene	1400	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	S06	WATER BY EVAP	7.6		% as received	05/29/03	06/11/03	06/11/03	MJS
310201A	MW-4(1.5-2)	G01PA	Benzene	54 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310201A	MW-4(1.5-2)	G01PA	Naphthalene	75 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310201B	MW-4(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310201B	MW-4(1.5-2)	G10PA	Anthracene	330 J	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benz(a)anthracene	930	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(a)pyrene	1100	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(b)fluoranthene	980	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(ghi)perylene	500	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Chrysene	910	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Fluorene	ND	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Phenanthrene	1200	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Pyrene	1100	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	S06	WATER BY EVAP	14		% as received	05/29/03	06/11/03	06/11/03	MJS
310202A	MW-4(11.5-12)	G01PA	Benzene	ND	250	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310202A	MW-4(11.5-12)	G01PA	Naphthalene	ND	250	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310202B	MW-4(11.5-12)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310202B	MW-4(11.5-12)	G10PA	Anthracene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benz(a)anthracene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310202B	MW-4(11.5-12)	G10PA	Benzo(a)pyrene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benzo(b)fluoranthene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benzo(ghi)perylene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Chrysene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Fluorene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Phenanthrene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Pyrene	260 J	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	S06	WATER BY EVAP	17.9		% as received	05/29/03	06/11/03	06/11/03	MJS
310203	TB	G01PA	Benzene	ND	5	ug/L	05/28/03	06/10/03	06/10/03	PSS
310203	TB	G01PA	Naphthalene	ND	5	ug/L	05/28/03	06/10/03	06/10/03	PSS

Methods Used for Summary# 75559:

Code	Description
760	Ext.Proc.-Sonication BN (Solids) SW 846 Method 3550B-mod.
G01PA	SW-846 5035/8260B/PA UST VOCs - BTEX;Cumene;Naph.;EDB;EDC
G10PA	SW-846 8270/PA UST PAHs
S06	Water by evaporation/ EPA-600 Mtd 160.3

SECOR International Incorporated

Philadelphia Office
102 Pickering Way, Suite 200
Exton, Pennsylvania 19341
Phone: (484) 875-3075
FAX: (484) 875-9286

LETTER OF TRANSMITTAL

Attn: Mr. Pat Chabeda **Date:** January 20, 2004

Company: Sunoco, Inc.

Address: Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Project: AST 846

RE: Revised AST #846 Site Assessment Report

ENCLOSED:
( ) **Proposal**
( ) **Contract**
(X) **Report**
( ) **Letter Report**
( ) **Other:**

FOR:
( ) **As Requested**
( ) **Review**
(X) **Your Information**
( ) **Approval**
( ) **Signature**
( ) **Return**
( ) **Other:**

Comments:
Upon review of the Site Assessment Report for AST 846 at the Philadelphia Refinery dated July 7, 2003, we have determined that PADEP regulations also allow for the use of less stringent soil remediation standards than those presented in Table 1 of the report. This results in more of the samples being below the PADEP criteria. As a result, we are submitting to you a revised report that should replace the July 7, 2003 report. It is my understanding that the tank is scheduled for demolition due to issues with the tank integrity. As was discussed with Sunoco in July 2003, since product was detected in the temporary wells, Sunoco may want to manage the area in accordance with the site-wide groundwater strategy.

Please contact me with any questions.

Signature: Steve Baggett
Title:

Cc: Jim Oppenheim, Jim Tucker, Dennis St. Dennis

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January 20, 2004

Mr. Jim Tucker
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank #846 Site Assessment Revised Report**
Sunoco Philadelphia Refinery, Philadelphia, Pennsylvania

Dear Mr. Tucker:

This letter summarizes the site assessment activities that were conducted in the vicinity of aboveground storage tank (AST) 846. The project site is located within the Sunoco, Inc. (Sunoco) Philadelphia Refinery located in Philadelphia, Pennsylvania (**Figure 1**). Site assessment activities were conducted to evaluate the vertical and lateral extent of impacted soil resulting from a product release that occurred during May 2002. Surface soils within the containment dike are visibly stained in some areas and a shallow (approximately 1 foot deep) trench was excavated around the perimeter of the AST to collect the product. Soil borings were advanced in order to evaluate the extent of impacted soil as well as to collect soil samples for laboratory analyses. In addition, temporary well points were installed in order to detect the presence of light non-aqueous phase liquids (LNAPL) on the water table surface.

Soil Boring Installation and Soil Sampling

Soil borings were advanced in the vicinity of AST 846 on May 28 and 29, 2003 by B.L. Myers using a truck-mounted direct-push drilling rig (Geoprobe®-type). The borings were advanced under the supervision of a SECOR International Incorporated (SECOR) Professional Geologist certified in Pennsylvania.

12 soil borings (GP-1 through GP-8 and MW-1 through MW-4) were installed in the corners of the dike containment area and adjacent to the trench surrounding AST 846. 25 soil samples were collected from the 12 soil borings. In addition, one surface soil sample (GP-9 (Surface)) was collected from the upper 0.3

feet of the visibly stained soil surrounding AST 846. Soil boring locations are depicted on **Figure 2**. Due to a rainfall event shortly before sampling, the northeast and northwest corners of the dike containment area were not accessible because the ground was too soft to support the weight of the drill rig. Borings at these locations were placed as close as possible to the corners. Soil borings were also not placed in the trench surrounding AST 846 because the trench was full of water from the rainfall event.

Soil samples were collected from 0 to 2 feet below ground surface (bgs) and from a half-foot interval above the water table in each boring except for GP-9 (Surface), which was a soil sample collected from the upper 0.3 feet of the visibly stained soil, and MW-2 where only a surface sample was collected because the boring collapsed at approximately 2 to 2.5 feet bgs. In addition, a third soil sample was collected from GP-7 (6.5-7) due to the presence of black sandy silt with an elevated PID reading. After collection, the soil samples were placed in appropriate laboratory containers, labeled, placed in an ice-chilled cooler and logged on a chain-of-custody form. The soil samples were delivered to Washington Group Environmental Services Laboratory of Boothwyn, Pennsylvania for analysis.

Observations recorded during soil boring installation are recorded on soil boring logs included in **Appendix A**. The soil boring logs include lithologic descriptions of material encountered and relative soil volatile organic vapor content based on photoionization detector (PID) readings. As indicated on the boring logs, the materials encountered were largely silt, sand, and fill material. Except for GP-7 (6.5-7), no stained soils were observed at depth (below a depth of approximately a few inches bgs). Groundwater was encountered at approximately 15-16 feet bgs in the borings.

Temporary Well Point Installation

Temporary well points were installed at boring locations MW-1, MW-3 and MW-4. The well points were constructed of 1¼ inch PVC. A temporary well point could not be installed at MW-2 because the boring collapsed at approximately 2 to 2.5 feet bgs and would not stay open. Well construction details are presented on the soil boring logs in **Appendix A**.

Laboratory Analyses of Soil Samples

The laboratory analyses selected for each the soil sample were based on the content of the AST. AST 846 was reported to contain crude oil. As a result, each soil sample was analyzed for Pennsylvania Department of Environmental Protection (PADEP) Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil #4, #5 #6, and Lubricating Oils and Fluids in soils. The list includes the analyses of benzene and naphthalene by EPA Method 5035/8260B and fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(g,h,i) perylene by EPA Method 8270C.

For quality assurance/quality control (QA/QC) purposes, a trip blank accompanied the sample shipment for the analysis of benzene and naphthalene by EPA Method 5035/8260B.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix B.** The analytical results for the soil samples were compared to the cleanup criteria established by for PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. Only GP-8 (1.5-2) exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for naphthalene with a concentration of 40,000 ug/kg (the Used Aquifer Nonresidential Soil-to-Groundwater MSC for naphthalene is 25,000 ug/kg).

Well Gauging Results

Temporary well points MW-1, MW-3 and MW-4 were gauged on June 20, 2003 for the presence of LNAPL. LNAPL was detected in MW-3 at a thickness of 0.89 feet. Well gauging results are summarized on **Table 2**.

Conclusions

The soil sampling results indicate that the Used Aquifer Nonresidential Soil-to-Groundwater MSCs were exceeded only at GP-8 (1.5-2). This sample exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSC for naphthalene. No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs. Where present, the visually impacted soil was limited to a few inches in depth.

LNAPL has been detected in existing monitoring wells (monitoring wells S-34 and S-35) installed at a former AST location immediately south of AST 846. Although LNAPL was detected in MW-3 in the vicinity of AST 846, it is likely that this LNAPL may be associated with an existing LNAPL plume

unrelated to AST 846 since soil samples collected immediately above the water table were below the Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

Sincerely,
SECOR International Incorporated

Sergio Morescalchi
Staff Geologist

Steve Baggett, P.G.
Principal Hydrogeologist

c: James Oppenheim (Sunoco)
Al Hornung (Sunoco)
Project File

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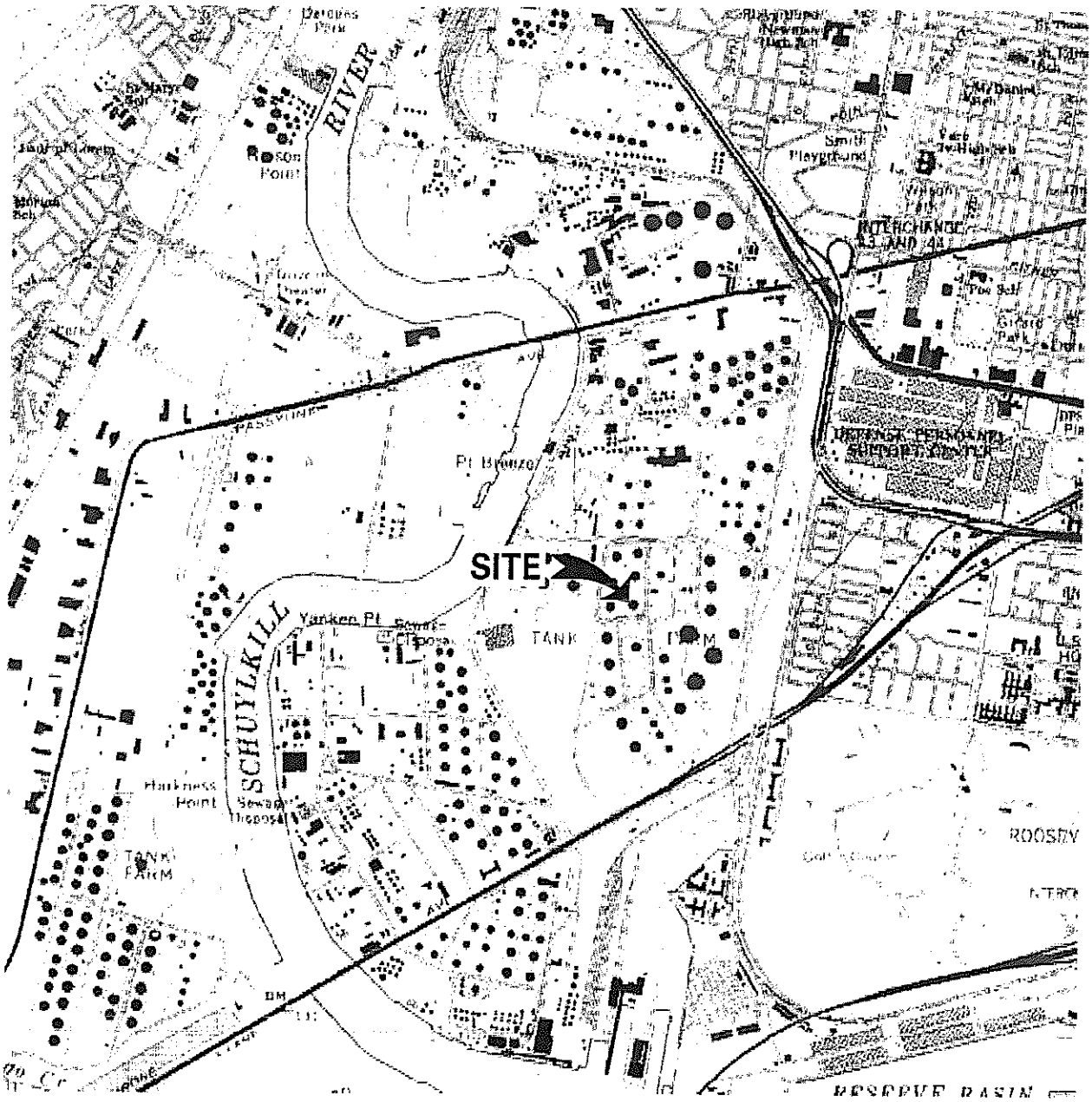
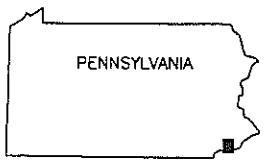




QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
International Incorporated
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA 19341
(484) 875-3076/875-9286 (FAX)

SITE LOCATION MAP

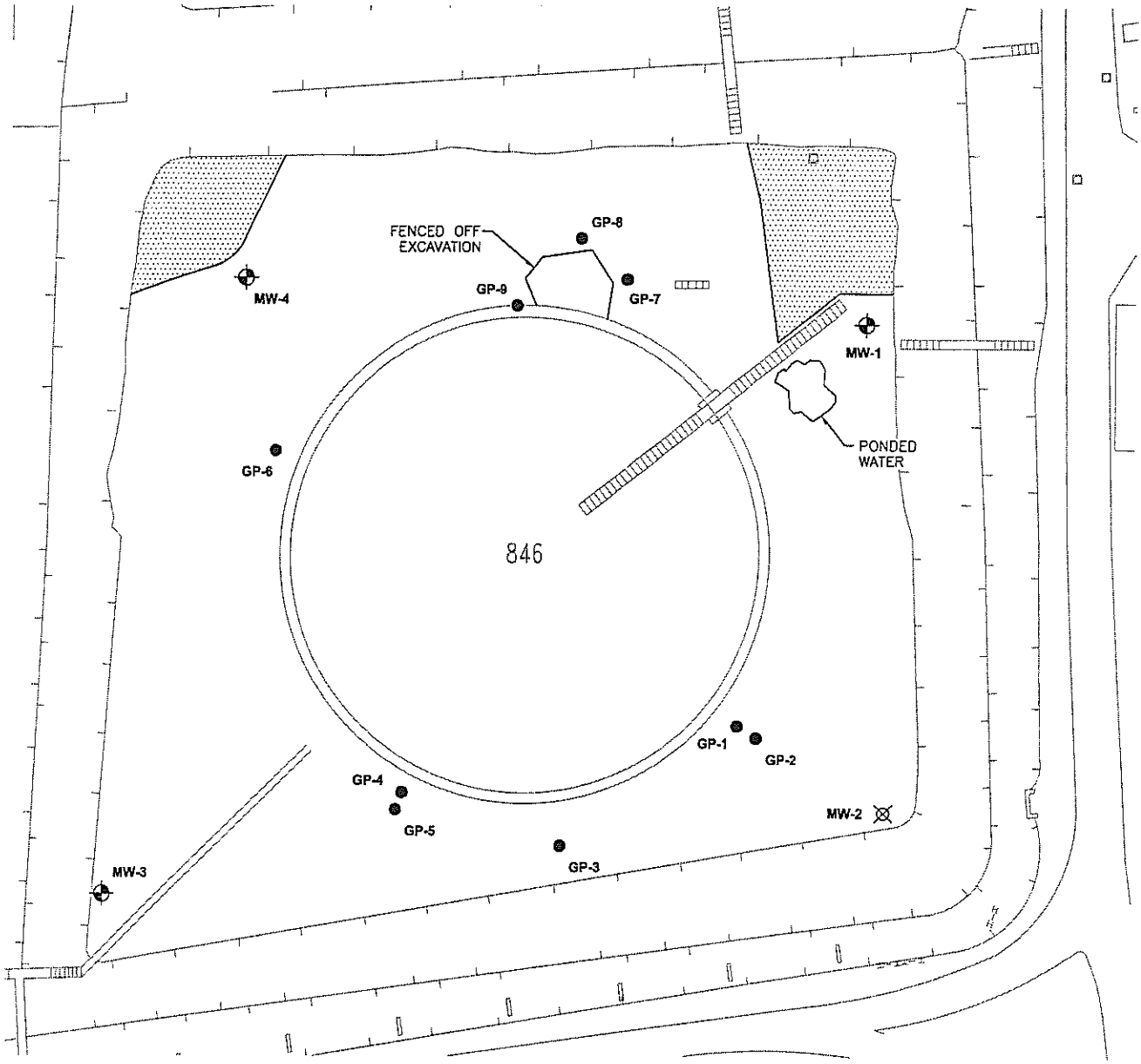
SUNOCO PHILADELPHIA REFINERY PROJECT
PHILADELPHIA, PENNSYLVANIA

FIGURE: **1**

JOB#: 62SU.01017.02 APPR: DWN: KPM DATE: 07/03/03

N:/OFFICE-062

DWG: 62SU-1017-2-61(AST846)



LEGEND

- GEOPROBE BORING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- GEOPROBE BORING – MONITORING WELL NOT INSTALLED
- GROUND TOO SOFT TO ACCESS

N

0 50 100

APPROXIMATE SCALE (FEET)

REFERENCE: HANDEX ENVIRONMENTAL RECOVERY, INC.; PROJECT 110535-12; DRAWINGNAME: PB_SY_05.DWG; TITLE: SOUTH YARD BASE MAP; DATE: 05/21/96

SECOR
International Incorporated
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA 19341
(484) 875-3075/875-9286 (FAX)

AST 846 GEOPROBE BORING AND MONITORING WELL LOCATIONS

SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

FIGURE: **2**

JOB#: 62SU.01017.02.0006 APPR: DWN: KPM DATE: 06/17/03

N:/SECOR-062

DWG: 62SU-1017-2-62(AST486)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	GP-1(1.5-2)	GP-1(15-15.5)	GP-2(1.5-2)	GP-2(15-15.5)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/28/03	05/28/03	05/28/03	05/28/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (250)	110 J	ND (230)	ND (260)	210,000	240,000	500
Naphthalene	200 J	3,700	720	2,200	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	500	ND (360)	ND (1800)	ND (360)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	2,000	ND (360)	5,000	ND (360)	110,000	190,000,000	320,000
Benzo(a)pyrene	2,200	ND (360)	4,800	ND (360)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	1,800	ND (360)	3,800	ND (360)	110,000	190,000,000	170,000
Benzo(ghi)perylene	670	ND (360)	1,700 J	ND (360)	170,000,000	190,000,000	180,000
Chrysene	1,800	ND (360)	4,400	ND (360)	11,000,000	190,000,000	230,000
Fluorene	ND (400)	400	ND (1800)	200 J	110,000,000	190,000,000	3,800,000
Phenanthrene	1,700	990	2,100	480	190,000,000	190,000,000	10,000,000
Pyrene	1,800	ND (360)	5,400	ND (360)	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

S:\Clients\Sunoco\AST Investigations\AST 846\May 2003 Geoprobe\[Soil analytical results rev jan 2004.xls]May 28-29, 2003

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	GP-3(0-2)	GP-3(15-15.5)	GP-4(1.5-2)	GP-4(15-15.5)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/28/03	05/28/03	05/28/03	05/28/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (310)	ND (250)	ND (240)	ND (250)	210,000	240,000	500
Naphthalene	ND (310)	420	ND (240)	240 J	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	310 J	ND (360)	1900 J	ND (370)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	1,600	ND (360)	4,100	ND (370)	110,000	190,000,000	320,000
Benzo(a)pyrene	1,400	ND (360)	3,500	ND (370)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	1,100	ND (360)	3,200	ND (370)	110,000	190,000,000	170,000
Benzo(ghi)perylene	410 J	ND (360)	1,200 J	ND (370)	170,000,000	190,000,000	180,000
Chrysene	1,400	ND (360)	4,000	ND (370)	11,000,000	190,000,000	230,000
Fluorene	ND (420)	ND (360)	ND (190)	270 J	110,000,000	190,000,000	3,800,000
Phenanthrene	1,100	350 J	10,000	690	190,000,000	190,000,000	10,000,000
Pyrene	2,000	ND (360)	7,300	ND (370)	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	GP-5(1.5-2)	GP-5(15-15.5)	GP-6(1.5-2)	GP-6(15.5-16)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/28/03	05/28/03	05/28/03	05/28/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (310)	140 J	ND (270)	ND (260)	210,000	240,000	500
Naphthalene	ND (310)	370	130 J	ND (260)	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	610 J	ND (370)	1,300	ND (420)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	2,100	ND (370)	2,700	ND (420)	110,000	190,000,000	320,000
Benzo(a)pyrene	2,300	ND (370)	2,300	ND (420)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	1,800	ND (370)	2,000	ND (420)	110,000	190,000,000	170,000
Benzo(ghi)perylene	880 J	ND (370)	770 J	ND (420)	170,000,000	190,000,000	180,000
Chrysene	2,000	ND (370)	2,400	ND (420)	11,000,000	190,000,000	230,000
Fluorene	ND (950)	250 J	500 J	ND (420)	110,000,000	190,000,000	3,800,000
Phenanthrene	1,900	660	4,700	ND (420)	190,000,000	190,000,000	10,000,000
Pyrene	2,400	ND (370)	3,600	ND (420)	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	GP-7(1.5-2)	GP-7(6.5-7)	GP-7(15.5-16)	GP-8(1.5-2)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/29/03	05/29/03	05/29/03	05/29/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (260)	160 J	340 J	ND (280)	210,000	240,000	500
Naphthalene	ND (260)	9,400	25,000	**40,000 D**	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	ND (2000)	ND (4700)	ND (3700)	ND (8100)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (2000)	ND (4700)	ND (3700)	ND (8100)	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (2000)	ND (4700)	ND (3700)	ND (8100)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	1300 J	ND (4700)	ND (3700)	ND (8100)	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (2000)	ND (4700)	ND (3700)	ND (8100)	170,000,000	190,000,000	180,000
Chrysene	ND (2000)	ND (4700)	ND (3700)	ND (8100)	11,000,000	190,000,000	230,000
Fluorene	ND (2000)	17,000	2200 J	7600 J	110,000,000	190,000,000	3,800,000
Phenanthrene	ND (2000)	49,000	5,000	22,000	190,000,000	190,000,000	10,000,000
Pyrene	ND (2000)	10,000	ND (3700)	4100 J	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

BOLD = Exceeds Soil to Groundwater MSC

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	GP-8(7.5-8)	GP-8(15-15.5)	GP-9(Surface)	MW-1(1.5-2)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/29/03	05/29/03	05/29/03	05/29/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (260)	ND (240)	54 J	ND (240)	210,000	240,000	500
Naphthalene	910	ND (240)	460	ND (240)	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	500 J	ND (370)	ND (57000)	880	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (760)	ND (370)	ND (57000)	2,100	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (760)	ND (370)	ND (57000)	1,900	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (760)	ND (370)	ND (57000)	2,000	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (760)	ND (370)	ND (57000)	710	170,000,000	190,000,000	180,000
Chrysene	630 J	ND (370)	ND (57000)	2,100	11,000,000	190,000,000	230,000
Fluorene	820	ND (370)	ND (57000)	390	110,000,000	190,000,000	3,800,000
Phenanthrene	3,400	380	230,000	3,100	190,000,000	190,000,000	10,000,000
Pyrene	1,300	ND (370)	37,000 J	3,200	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	MW-1(11.5-12)	MW-2(0-2)	MW-3(1.5-2)	MW-3(15.5-16)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/29/03	05/29/03	05/29/03	05/29/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs							
Benzene	ND (260)	87 J	ND (250)	65 J	210,000	240,000	500
Naphthalene	ND (260)	55 J	ND (250)	3,400	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	ND (360)	290 J	350 J	ND (360)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (360)	730	2,700	ND (360)	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (360)	800	5000 D	ND (360)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (360)	690	3,900	ND (360)	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (360)	370 J	1,800	ND (360)	170,000,000	190,000,000	180,000
Chrysene	ND (360)	730	2,500	ND (360)	11,000,000	190,000,000	230,000
Fluorene	ND (360)	ND (390)	ND (370)	600	110,000,000	190,000,000	3,800,000
Phenanthrene	ND (360)	1,100	860	1,400	190,000,000	190,000,000	10,000,000
Pyrene	ND (360)	1,200	1,800	ND (360)	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 1
Summary of Soil Analytical Results

AST 846
Sunoco Philadelphia Refinery

Sample Description	MW-4(1.5-2)	MW-4(11.5-12)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
Sample Collection Date	05/29/03	05/29/03			
Units	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
VOCs					
Benzene	54 J	ND (250)	210,000	240,000	500
Naphthalene	75 J	ND (250)	56,000,000	190,000,000	25,000
SVOCs					
Anthracene	330 J	ND (410)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	930	ND (410)	110,000	190,000,000	320,000
Benzo(a)pyrene	1,100	ND (410)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	980	ND (410)	110,000	190,000,000	170,000
Benzo(ghi)perylene	500	ND (410)	170,000,000	190,000,000	180,000
Chrysene	910	ND (410)	11,000,000	190,000,000	230,000
Fluorene	ND (390)	ND (410)	110,000,000	190,000,000	3,800,000
Phenanthrene	1,200	ND (410)	190,000,000	190,000,000	10,000,000
Pyrene	1,100	260 J	84,000,000	190,000,000	2,200,000

NOTES:

All results in ug/kg (micrograms per kilogram)

ND (250) = Not detected at or above the laboratory reporting limit

J = Estimated value

D = Result was obtained from a different dilution than the other analytes

MSCs = Medium-Specific Concentrations

BOLD = Exceeds Soil to Groundwater MSC

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

TABLE 2
Well Gauging Data
June 20, 2003

AST 846
Sunoco Philadelphia Refinery

Well	Depth To		LNAPL Thickness (Feet)
	LNAPL (Feet)	Water (Feet)	
MW-1	ND	13.01	--
MW-3	16.94	17.83	0.89
MW-4	ND	4.22	--

NOTES:

LNAPL = Light Nonaqueous phase liquid

ND = No LNAPL detected

MW-4 was in a pool of standing water

Depth to water in MW-4 is above the screened-interval

S:\Clients\Sunoco\AST Investigations\AST 846\[well gauging data.xls]june 20, 20

APPENDIX A

Soil Boring Logs

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/29/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	MW-1

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): 20.0	Casing Length (ft):	Screen Length (ft):

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT; little fine sand, trace medium to coarse sand, brown, moist.	4.0	0.0
			SILT; little fine sand, trace medium to coarse sand, piece of brick, brown, dry.		0.0
			SILT; little fine sand, trace medium to coarse sand, piece of brick, black and dark gray, dry.		0.0
			SILT; little fine sand, trace medium to coarse sand, trace fine gravel, piece of brick, black and dark gray, dry.		0.0
			SILT; trace fine sand, gray, dry.		0.0
			CLAY; some silt, trace fine sand, brown, moist.	3.0	0.0
	5		SILT; some clay, trace fine sand, brown, moist.		0.0
			SILT; trace clay, trace fine sand, brown, moist.		0.0
					0.0
			SILT; some fine sand, brown, moist.		0.0
					0.0
			SAND, fine to coarse; little fine gravel, red and brown, dry.	2.0	0.0
	10				0.0
					0.0
					0.0
			SAND, fine to coarse; little silt, reddish brown, wet.	4.0	0.0
					0.0
					0.0
					0.0
					0.0
	15		SAND, fine to coarse; little fine gravel, reddish brown, wet.		7.6
			SAND, fine; some medium to coarse sand, reddish brown, wet.		150
			SAND, fine to coarse; little fine gravel, little silt, brown, wet.	3.0	341
					92.5
					182
					316
					244
					126
	20				58.8

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-2**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				12.5		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT and SAND, fine to coarse; some fine gravel, brown, moist.	2.0	0.0
		CLAY; little silt, little fine sand, gray, dry.		0.0
		SILT; little clay, little fine sand, gray, dry.		0.0
		SAND, fine; little silt, gray, dry.		0.0
		SAND, fine; trace medium to coarse sand, trace fine gravel, dry.	3.0	0.0
5				0.0
				0.0
		SAND, fine; some fine gravel, trace medium to coarse sand, dry.		0.0
		SAND, fine to coarse; little silt, reddish brown, dry.		0.0
				0.0
		SAND, fine to coarse; little silt, brown, wet.	3.0	0.0
				0.0
10				0.0
		SAND, fine to coarse; trace fine gravel, reddish brown, moist.		0.0
				0.0
		SAND, fine to coarse; little fine gravel, brown, moist.	.5	0.0
15		Boring collapsed at 2.5 feet below grade. Could not keep boring open. Could not set well.		
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-3**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				20.0		

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT and SAND, fine to coarse; brown, moist.	4.0	0.0
			SILT; little fine sand, trace medium to coarse sand, brown, dry.		0.0
					0.0
					0.0
			SILT; little fine sand, little medium to coarse sand, dark brown and black, dry.		0.0
					0.0
			SILT; some fine sand, little medium to coarse sand, black, dry.	4.0	14.3
	5				45.7
			SILT; little fine sand, dark brown, dry.		32.5
			SILT; little fine sand, brown, dry.		0.0
					0.0
			SILT; little fine sand, dark brown and gray, dry.		0.0
			SILT; some fine sand, dark brown and gray, dry.		0.0
			CLAY; little fine sand, brown, dry.	2.5	0.0
					0.0
	10				0.0
					0.0
			SAND, fine to coarse; little fine gravel, red and brown, dry.		0.0
					0.0
				3.5	0.0
					0.0
					7.6
					21.6
	15				152
					300
			SAND, fine to coarse; little fine gravel, red and brown, wet.	3.0	415
					700
			SAND, fine; little medium to coarse sand, reddish brown, wet.		619
					311
					298
	20				316

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**MW-4**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Well Construction	Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
	0		SILT; some fine sand, little medium to coarse sand, brown, moist.	3.5	13.3
			SILT; some fine to coarse sand, pieces of brick, brown, dry.		15.6
					17.9
					9.1
					0.0
			CLAY; some silt, little fine sand, dark gray, dry.		0.0
					5.1
			CLAY; some silt, little fine sand, dark gray, wet.	2.0	0.0
	5		SILT; some clay, some fine to coarse sand, gray, wet.		0.0
					0.0
					0.0
			SILT; some clay, some fine to coarse sand, pieces of brick, gray, wet.	3.0	0.0
					0.0
					0.0
	10				0.0
			CLAY; little silt, little fine to coarse sand, gray, dry.		0.0
			SILT; some clay, little fine sand, gray, dry.		0.0
			NO RECOVERY 12-16 feet.	0.0	
	15				
	20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/28/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	GP-1

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): 16.0	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		CLAY and SAND, fine to coarse; some fine gravel, brown (black at top), moist.	4.0	69.5
		Piece of BRICK.		0.0
		SILT and SAND, fine to coarse; dark brown, moist.		0.0
		SILT and SAND, fine to coarse; trace fine gravel, dark brown, moist.		0.0
				0.0
		SILT; little fine to coarse sand, piece of brick, dark gray, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.	3.5	0.0
5		Piece of QUARTZ.		0.0
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		0.0
		SAND, fine; some medium to coarse sand, little fine gravel, brown, dry.		0.0
		SAND, fine; some silt, little medium to coarse sand, brown, dry.		0.0
		SAND, fine; little medium to coarse sand, little silt, brown, dry.	3.5	0.0
		SAND, fine to coarse; little fine gravel, brown and red, dry.		0.0
10				
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.	4.0	19.7
				9.5
		SAND, fine; trace medium to coarse sand, brown, dry.		0.0
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		53.4
15				74.5
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, wet.		130
				171
				252
20				

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-2**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		GRAVEL, fine and SILT; little medium to coarse sand, brown, moist.	3.0	0.0
		SAND, fine; some silt, little medium to coarse sand, trace fine gravel, dark brown and black, dry.		0.0
		SAND, fine; little silt, little medium to coarse sand, trace fine gravel, dark brown, dry.		0.0
				0.0
		SILT; some fine to coarse sand, dark brown, dry.		0.0
				6.2
		SILT; trace fine sand, light gray, dry.	3.0	0.0
		SAND, fine; trace medium sand, brown, dry.		0.0
5		SAND, fine; little medium to coarse, trace fine gravel, brown, dry.		0.0
				0.0
		SAND, fine; trace medium to coarse sand, reddish brown, dry.		0.0
		SAND, fine; some medium to coarse sand, little silt, reddish brown, dry.		0.0
		SAND, fine to coarse; little fine gravel, brown, dry.	3.0	5.1
				0.0
10				0.0
				6.8
				9.2
			3.0	0.0
		SAND, fine; little medium to coarse sand, brown, dry.		6.1
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.		18.6
				75.1
15				187
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, wet.		243
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/28/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	GP-3

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): 16.0	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; some fine to coarse sand, little fine gravel, brown, moist.	3.0	0.0
		GRAVEL, fine; little fine to coarse sand, gray, dry.		0.0
		SILT and SAND, fine; some medium to coarse sand, dark gray, dry.		0.0
		SILT; some fine to coarse sand, trace fine gravel, dark brown, dry.		0.0
				0.0
		SILT; little fine to coarse sand, trace fine gravel, dark brown, dry.		0.0
		SAND, fine; trace medium to coarse sand, brown, dry.	3.0	0.0
5		SAND, fine; some medium to coarse, little fine gravel, brown, dry.		0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
				0.0
				0.0
			4.0	5.1
		SAND, fine to coarse; little fine gravel, trace coarse gravel, brown, dry.		0.0
10		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
				0.0
				0.0
		SAND, fine and SAND, medium to coarse; trace fine gravel, brown, dry.	3.0	0.0
				0.0
				0.0
				0.0
15				36.5
				231
		SAND, fine and SAND, medium to coarse; trace fine gravel, brown, dry (wet at bottom).		331
20				

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-4**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; little fine sand, trace medium to coarse sand, brown, moist.	3.5	0.0
		SAND, fine; some silt, some medium to coarse sand, dark brown, moist.		0.0
		SILT; little medium to coarse sand, dark brown, moist.		0.0
		SILT; little medium to coarse sand, dark gray, dry.		0.0
		SILT; little fine to coarse sand, dark gray, dry.		0.0
		SILT; little fine to coarse sand, brown, dry.		0.0
				0.0
		SILT; some clay, little fine sand, brown, moist.	2.0	0.0
5				
		SAND, fine; brown, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SAND, fine to coarse; some fine gravel, brown, dry.	3.0	0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
10				6.3
				8.6
				0.0
		SAND, fine to coarse; some silt, brown, dry.	3.0	0.0
				0.0
		SAND, fine to coarse; little fine gravel, brown, dry.		0.0
				0.0
15				98.1
		SAND, fine; some medium to coarse sand, brown, wet.		338
20				

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Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-5**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): **16.0**	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; some fine to coarse sand, little fine gravel, brown, wet.	3.0	0.0
		SILT; some fine to coarse sand, little fine gravel, pieces of brick, brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
		SILT; little fine sand, little clay, light gray, dry.		0.0
		SILT; little fine sand, little clay, trace fine sand, light gray, dry.		0.0
		SILT; little clay, little fine sand, trace medium to coarse sand, brown, moist.	3.5	0.0
5				0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SAND, fine; little medium to coarse sand, trace fine gravel, brown, dry.		0.0
		SAND, fine and SAND, medium to coarse; some fine gravel, light brown, dry.		0.0
				0.0
				0.0
		SAND, fine to coarse; some fine gravel, reddish brown, dry.	3.0	0.0
				0.0
10				0.0
				0.0
				0.0
				0.0
			2.0	14.8
				5.0
		SAND, fine; some medium to coarse sand, trace fine gravel, brown, dry.		90.8
15		SAND, fine; trace medium to coarse sand, brown, wet.		318
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/28/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-6**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): **16.0**	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT and SAND, fine; some medium to coarse sand, brown, moist.	3.0	0.0
		SILT; some fine to coarse sand, brown, dry.		13.5
		SILT and BRICK; little fine to coarse sand, brown, dry.		7.7
		SILT; little fine to coarse sand, brown, dry.		5.0
		SILT; some fine sand, little medium to coarse sand, brown, dry.		0.0
				0.0
		SAND, fine; little medium to coarse sand, pieces of brick, brown, dry.	3.5	7.6
5				0.0
		SILT; some fine to coarse sand, pieces of brick, dark gray, dry.		0.0
		SILT; some fine sand, little clay, brown, dry.		0.0
				0.0
				0.0
				0.0
		SILT; little fine sand, brown, dry.	4.0	0.0
		SILT; little fine sand, dark gray, dry.		0.0
10				0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
		SILT; some fine sand, trace medium sand, brown, dry.	3.0	0.0
		CLAY; little silt, little fine sand, brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
15		SILT; little fine sand, gray and brown, dry.		0.0
				0.0
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	05/29/03	B.L. Myers Bros., Inc.	Sunoco, Inc. AST 846	Geoprobe	GP-7

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft): 16.0	Casing Length (ft):	Screen Length (ft):

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SAND, fine; trace medium to coarse sand, brown, moist.	3.5	0.0
		SILT; little medium to coarse sand, brown, dry.		0.0
		BRICK.		0.0
		WOOD.		0.0
		SILT; little fine sand, brown, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, dry.		0.0
		SILT; some medium to coarse sand, piece of brick, brown, dry.	3.0	0.0
5		SILT; some medium to coarse sand, brown, dry.		0.0
				0.0
				0.0
		SILT; some medium to coarse sand, black, dry.		38.4
				15.5
				12.4
			4.0	5.1
		SILT; little fine sand, brown, dry.		0.0
				0.0
10		SILT; little fine sand, orange brown, dry.		0.0
		SILT; little fine sand, brown, dry.		0.0
				0.0
				0.0
		SILT; some fine to coarse sand, brown, wet.	4.0	0.0
				0.0
		SILT; some fine to coarse sand, brown, dry.		0.0
				0.0
				0.0
15		SAND, fine; little silt, little medium to coarse sand, brown, dry.		0.0
		SAND, fine; little silt, little medium to coarse sand, brown, dry (wet at bottom).		0.0
				113
				155
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

Figure

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**	**Geoprobe**	**GP-8**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				16.0		

Depth, (ft.)	Sample Type	Description	Recovery (Feet)	PID Reading (ppm)
		SILT; little fine to coarse sand, brown, dry.	2.5	132
				62.9
				13.0
		SILT; little fine to coarse sand, little fine gravel, gray, dry.		0.0
				0.0
		CLAY; some silt, little fine to coarse sand, brown, moist.	4.0	20.1
5				30.7
				18.5
		SILT and SAND, fine to coarse; black, dry.		24.4
				13.8
				10.5
				37.7
		SILT; some fine to coarse sand, brown, dry.	4.0	40.1
				0.0
		SILT and SAND, fine to coarse; black, moist.		0.0
				20.8
10		SILT; little fine to coarse sand, black and brown, moist.		10.2
		SILT; little fine to coarse sand, brown, moist.		5.6
		SILT; some clay, little fine to coarse sand, brown, dry.		0.0
		CLAY; some silt, trace fine sand, brown, dry.	3.0	0.0
		SILT; little fine sand, gray and dark brown, dry.		0.0
				0.0
				0.0
				0.0
15		SAND, fine; some medium to coarse sand, little silt, trace fine gravel, dark brown, dry.		0.0
		SAND, fine; little medium to coarse sand, brown, moist.		20.7
				131
20				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

SECOR
International Incorporated

Logged By:	Date Drilled:	Drilling Contractor	Project Name:	Method/Equipment:	Boring Number:
SM	**05/29/03**	**B.L. Myers Bros., Inc.**	**Sunoco, Inc. AST 846**		**GP-9**

See "Legend to Logs" for sampling method, classifications and laboratory testing methods	Boring Diam.(in.):	Surface Elev.(ft.):	Groundwater Depth (ft.):	Total Depth (ft):	Casing Length (ft):	Screen Length (ft):
				0.3		

Depth, (ft.)	Sample Type	Description
		Surface sample.
5		
10		
15		
20		

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. **62SU.01017.02** Date **May 2003**

Log of Boring

Figure

MAY 2003 LOGS.GPJ
LOG OF BOREHOLE

APPENDIX B

Laboratory Analytical Reports

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310177A	GP-1(1.5-2)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310177A	GP-1(1.5-2)	G01PA	Naphthalene	200 J	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310177B	GP-1(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310177B	GP-1(1.5-2)	G10PA	Anthracene	500	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benz(a)anthracene	2000	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(a)pyrene	2200	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(b)fluoranthene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Benzo(ghi)perylene	670	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Chrysene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Fluorene	ND	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Phenanthrene	1700	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	G10PA	Pyrene	1800	400	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310177B	GP-1(1.5-2)	S06	WATER BY EVAP	16.3		% as received	05/28/03	06/11/03	06/11/03	MJS
310178A	GP-1(15-15.5)	G01PA	Benzene	110 J	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310178A	GP-1(15-15.5)	G01PA	Naphthalene	3700	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310178B	GP-1(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310178B	GP-1(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Fluorene	400	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Phenanthrene	990	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310178B	GP-1(15-15.5)	S06	WATER BY EVAP	7.3		% as received	05/28/03	06/11/03	06/11/03	MJS
310179A	GP-2(1.5-2)	G01PA	Benzene	ND	230	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310179A	GP-2(1.5-2)	G01PA	Naphthalene	720	230	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310179B	GP-2(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310179B	GP-2(1.5-2)	G10PA	Anthracene	ND	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benz(a)anthracene	5000	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benzo(a)pyrene	4800	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Benzo(b)fluoranthene	3800	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310179B	GP-2(1.5-2)	G10PA	Benzo(ghi)perylene	1700 J	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Chrysene	4400	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Fluorene	ND	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Phenanthrene	2100	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	G10PA	Pyrene	5400	1800	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310179B	GP-2(1.5-2)	S06	WATER BY EVAP	8.5		% as received	05/28/03	06/11/03	06/11/03	MJS
310180A	GP-2(15-15.5)	G01PA	Benzene	ND	260	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310180A	GP-2(15-15.5)	G01PA	Naphthalene	2200	260	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310180B	GP-2(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310180B	GP-2(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Fluorene	200 J	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Phenanthrene	480	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310180B	GP-2(15-15.5)	S06	WATER BY EVAP	6.9		% as received	05/28/03	06/11/03	06/11/03	MJS
310181A	GP-3(0-2)	G01PA	Benzene	ND	310	ug/kg-dry	05/28/03	06/05/03	06/05/03	WJD
310181A	GP-3(0-2)	G01PA	Naphthalene	ND	310	ug/kg-dry	05/28/03	06/05/03	06/05/03	WJD
310181B	GP-3(0-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310181B	GP-3(0-2)	G10PA	Anthracene	310 J	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benz(a)anthracene	1600	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(a)pyrene	1400	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(b)fluoranthene	1100	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Benzo(ghi)perylene	410 J	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Chrysene	1400	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Fluorene	ND	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Phenanthrene	1100	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	G10PA	Pyrene	2000	420	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310181B	GP-3(0-2)	S06	WATER BY EVAP	20.4		% as received	05/28/03	06/11/03	06/11/03	MJS
310182A	GP-3(15-15.5)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310182A	GP-3(15-15.5)	G01PA	Naphthalene	420	250	ug/kg-dry	05/28/03	06/06/03	06/06/03	PSS
310182B	GP-3(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310182B	GP-3(15-15.5)	G10PA	Anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Chrysene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Fluorene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Phenanthrene	350 J	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	G10PA	Pyrene	ND	360	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310182B	GP-3(15-15.5)	S06	WATER BY EVAP	6.6		% as received	05/28/03	06/11/03	06/11/03	MJS
310183A	GP-4(1.5-2)	G01PA	Benzene	ND	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310183A	GP-4(1.5-2)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310183B	GP-4(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310183B	GP-4(1.5-2)	G10PA	Anthracene	1900 J	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benz(a)anthracene	4100	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(a)pyrene	3500	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(b)fluoranthene	3200	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Benzo(ghi)perylene	1200 J	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Chrysene	4000	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Fluorene	ND	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Phenanthrene	10000	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	G10PA	Pyrene	7300	1900	ug/kg-dry	05/28/03	06/14/03	06/14/03	SAB
310183B	GP-4(1.5-2)	S06	WATER BY EVAP	14.5		% as received	05/28/03	06/11/03	06/11/03	MJS
310184A	GP-4(15-15.5)	G01PA	Benzene	ND	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310184A	GP-4(15-15.5)	G01PA	Naphthalene	240 J	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310184B	GP-4(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310184B	GP-4(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310184B	GP-4(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Fluorene	270 J	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Phenanthrene	690	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310184B	GP-4(15-15.5)	S06	WATER BY EVAP	9.7		% as received	05/28/03	06/11/03	06/11/03	MJS
310185A	GP-5(1.5-2)	G01PA	Benzene	ND	310	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310185A	GP-5(1.5-2)	G01PA	Naphthalene	ND	310	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310185B	GP-5(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310185B	GP-5(1.5-2)	G10PA	Anthracene	610 J	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benz(a)anthracene	2100	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(a)pyrene	2300	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(b)fluoranthene	1800	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Benzo(ghi)perylene	880 J	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Chrysene	2000	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Fluorene	ND	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Phenanthrene	1900	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	G10PA	Pyrene	2400	950	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310185B	GP-5(1.5-2)	S06	WATER BY EVAP	29.8		% as received	05/28/03	06/11/03	06/11/03	MJS
310186A	GP-5(15-15.5)	G01PA	Benzene	140 J	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310186A	GP-5(15-15.5)	G01PA	Naphthalene	370	250	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310186B	GP-5(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310186B	GP-5(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Fluorene	250 J	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Phenanthrene	660	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310186B	GP-5(15-15.5)	S06	WATER BY EVAP	9.7		% as received	05/28/03	06/11/03	06/11/03	MJS
310187A	GP-6(1.5-2)	G01PA	Benzene	ND	270	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS
310187A	GP-6(1.5-2)	G01PA	Naphthalene	130 J	270	ug/kg-dry	05/28/03	06/10/03	06/10/03	PSS

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310187B	GP-6(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310187B	GP-6(1.5-2)	G10PA	Anthracene	1300	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benz(a)anthracene	2700	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(a)pyrene	2300	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(b)fluoranthene	2000	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Benzo(ghi)perylene	770 J	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Chrysene	2400	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Fluorene	500 J	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Phenanthrene	4700	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	G10PA	Pyrene	3600	780	ug/kg-dry	05/28/03	06/12/03	06/12/03	SAB
310187B	GP-6(1.5-2)	S06	WATER BY EVAP	14.1		% as received	05/28/03	06/11/03	06/11/03	MJS
310188A	GP-6(15.5-16)	G01PA	Benzene	ND	260	ug/kg-dry	05/28/03	06/07/03	06/07/03	PSS
310188A	GP-6(15.5-16)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/28/03	06/07/03	06/07/03	PSS
310188B	GP-6(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/28/03	06/06/03	06/09/03	ALH
310188B	GP-6(15.5-16)	G10PA	Anthracene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benz(a)anthracene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(a)pyrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Benzo(ghi)perylene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Chrysene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Fluorene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Phenanthrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	G10PA	Pyrene	ND	420	ug/kg-dry	05/28/03	06/10/03	06/10/03	SAB
310188B	GP-6(15.5-16)	S06	WATER BY EVAP	20		% as received	05/28/03	06/11/03	06/11/03	MJS
310189A	GP-7(1.5-2)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310189A	GP-7(1.5-2)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310189B	GP-7(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310189B	GP-7(1.5-2)	G10PA	Anthracene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benz(a)anthracene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(a)pyrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(b)fluoranthene	1300 J	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Benzo(ghi)perylene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Chrysene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310189B	GP-7(1.5-2)	G10PA	Fluorene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Phenanthrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	G10PA	Pyrene	ND	2000	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310189B	GP-7(1.5-2)	S06	WATER BY EVAP	16.6		% as received	05/29/03	06/11/03	06/11/03	MJS
310190A	GP-7(6.5-7)	G01PA	Benzene	160 J	330	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310190A	GP-7(6.5-7)	G01PA	Naphthalene	9400	330	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310190B	GP-7(6.5-7)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310190B	GP-7(6.5-7)	G10PA	Anthracene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benz(a)anthracene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(a)pyrene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(b)fluoranthene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Benzo(ghi)perylene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Chrysene	ND	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Fluorene	17000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Phenanthrene	49000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	G10PA	Pyrene	10000	4700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310190B	GP-7(6.5-7)	S06	WATER BY EVAP	29		% as received	05/29/03	06/11/03	06/11/03	MJS
310191A	GP-7(15.5-16)	G01PA	Benzene	340 J	950	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310191A	GP-7(15.5-16)	G01PA	Naphthalene	25000	950	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310191B	GP-7(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310191B	GP-7(15.5-16)	G10PA	Anthracene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benz(a)anthracene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(a)pyrene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Benzo(ghi)perylene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Chrysene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Fluorene	2200 J	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Phenanthrene	5000	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	G10PA	Pyrene	ND	3700	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310191B	GP-7(15.5-16)	S06	WATER BY EVAP	8.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310192A	GP-8(1.5-2)	G01PA	Benzene	ND	280	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310192A	GP-8(1.5-2)	G01PA	Naphthalene	40000 D	280	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310192B	GP-8(1.5-2)	,760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH

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Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310192B	GP-8(1.5-2)	G10PA	Anthracene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benz(a)anthracene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(a)pyrene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(b)fluoranthene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Benzo(ghi)perylene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Chrysene	ND	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Fluorene	7600 J	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Phenanthrene	22000	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	G10PA	Pyrene	4100 J	8100	ug/kg-dry	05/29/03	06/14/03	06/14/03	SAB
310192B	GP-8(1.5-2)	S06	WATER BY EVAP	17.5		% as received	05/29/03	06/11/03	06/11/03	MJS
310193A	GP-8(7.5-8)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310193A	GP-8(7.5-8)	G01PA	Naphthalene	910	260	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310193B	GP-8(7.5-8)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310193B	GP-8(7.5-8)	G10PA	Anthracene	500 J	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benz(a)anthracene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(a)pyrene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(b)fluoranthene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Benzo(ghi)perylene	ND	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Chrysene	630 J	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Fluorene	820	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Phenanthrene	3400	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	G10PA	Pyrene	1300	760	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310193B	GP-8(7.5-8)	S06	WATER BY EVAP	12.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310194A	GP-8(15-15.5)	G01PA	Benzene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310194A	GP-8(15-15.5)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310194B	GP-8(15-15.5)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310194B	GP-8(15-15.5)	G10PA	Anthracene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benz(a)anthracene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(a)pyrene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(b)fluoranthene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Benzo(ghi)perylene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Chrysene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Fluorene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310194B	GP-8(15-15.5)	G10PA	Phenanthrene	380	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	G10PA	Pyrene	ND	370	ug/kg-dry	05/29/03	06/10/03	06/10/03	SAB
310194B	GP-8(15-15.5)	S06	WATER BY EVAP	8.9		% as received	05/29/03	06/11/03	06/11/03	MJS
310195A	GP-9(Surface)	G01PA	Benzene	54 J	270	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310195A	GP-9(Surface)	G01PA	Naphthalene	460	270	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310195B	GP-9(Surface)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310195B	GP-9(Surface)	G10PA	Anthracene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benz(a)anthracene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(a)pyrene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(b)fluoranthene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Benzo(ghi)perylene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Chrysene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Fluorene	ND	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Phenanthrene	230000	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	G10PA	Pyrene	37000 J	57000	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310195B	GP-9(Surface)	S06	WATER BY EVAP	6.3		% as received	05/29/03	06/11/03	06/11/03	MJS
310196A	MW-1(1.5-2)	G01PA	Benzene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310196A	MW-1(1.5-2)	G01PA	Naphthalene	ND	240	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310196B	MW-1(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310196B	MW-1(1.5-2)	G10PA	Anthracene	880	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benz(a)anthracene	2100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(a)pyrene	1900	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(b)fluoranthene	2000	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Benzo(ghi)perylene	710	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Chrysene	2100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Fluorene	390	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Phenanthrene	3100	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	G10PA	Pyrene	3200	380	ug/kg-dry	05/29/03	06/13/03	06/13/03	SAB
310196B	MW-1(1.5-2)	S06	WATER BY EVAP	13.2		% as received	05/29/03	06/11/03	06/11/03	MJS
310197A	MW-1(11.5-12)	G01PA	Benzene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310197A	MW-1(11.5-12)	G01PA	Naphthalene	ND	260	ug/kg-dry	05/29/03	06/07/03	06/07/03	PSS
310197B	MW-1(11.5-12)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310197B	MW-1(11.5-12)	G10PA	Anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB

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Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310197B	MW-1(11.5-12)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Chrysene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Fluorene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Phenanthrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	G10PA	Pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310197B	MW-1(11.5-12)	S06	WATER BY EVAP	8.4		% as received	05/29/03	06/11/03	06/11/03	MJS
310198A	MW-2(0-2)	G01PA	Benzene	87 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310198A	MW-2(0-2)	G01PA	Naphthalene	55 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310198B	MW-2(0-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310198B	MW-2(0-2)	G10PA	Anthracene	290 J	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benz(a)anthracene	730	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(a)pyrene	800	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(b)fluoranthene	690	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Benzo(ghi)perylene	370 J	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Chrysene	730	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Fluorene	ND	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Phenanthrene	1100	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	G10PA	Pyrene	1200	390	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310198B	MW-2(0-2)	S06	WATER BY EVAP	15.1		% as received	05/29/03	06/11/03	06/11/03	MJS
310199A	MW-3(1.5-2)	G01PA	Benzene	ND	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310199A	MW-3(1.5-2)	G01PA	Naphthalene	ND	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310199B	MW-3(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310199B	MW-3(1.5-2)	G10PA	Anthracene	350 J	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benz(a)anthracene	2700	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(a)pyrene	5000 D	750	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(b)fluoranthene	3900	750	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Benzo(ghi)perylene	1800	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Chrysene	2500	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Fluorene	ND	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	G10PA	Phenanthrene	860	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310199B	MW-3(1.5-2)	G10PA	Pyrene	1800	370	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310199B	MW-3(1.5-2)	S06	WATER BY EVAP	10.8		% as received	05/29/03	06/11/03	06/11/03	MJS
310200A	MW-3(15.5-16)	G01PA	Benzene	65 J	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310200A	MW-3(15.5-16)	G01PA	Naphthalene	3400	250	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310200B	MW-3(15.5-16)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310200B	MW-3(15.5-16)	G10PA	Anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benz(a)anthracene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(a)pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(b)fluoranthene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Benzo(ghi)perylene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Chrysene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Fluorene	600	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Phenanthrene	1400	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	G10PA	Pyrene	ND	360	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310200B	MW-3(15.5-16)	S06	WATER BY EVAP	7.6		% as received	05/29/03	06/11/03	06/11/03	MJS
310201A	MW-4(1.5-2)	G01PA	Benzene	54 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310201A	MW-4(1.5-2)	G01PA	Naphthalene	75 J	270	ug/kg-dry	05/29/03	06/08/03	06/08/03	PSS
310201B	MW-4(1.5-2)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310201B	MW-4(1.5-2)	G10PA	Anthracene	330 J	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benz(a)anthracene	930	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(a)pyrene	1100	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(b)fluoranthene	980	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Benzo(ghi)perylene	500	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Chrysene	910	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Fluorene	ND	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Phenanthrene	1200	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	G10PA	Pyrene	1100	390	ug/kg-dry	05/29/03	06/12/03	06/12/03	SAB
310201B	MW-4(1.5-2)	S06	WATER BY EVAP	14		% as received	05/29/03	06/11/03	06/11/03	MJS
310202A	MW-4(11.5-12)	G01PA	Benzene	ND	250	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310202A	MW-4(11.5-12)	G01PA	Naphthalene	ND	250	ug/kg-dry	05/29/03	06/10/03	06/10/03	PSS
310202B	MW-4(11.5-12)	760	EXT BN SOLIDS			COMPLETE	05/29/03	06/06/03	06/09/03	ALH
310202B	MW-4(11.5-12)	G10PA	Anthracene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benz(a)anthracene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB

THE WASHINGTON GROUP ENVIRONMENTAL LABORATORY
Analytical Results for Summary# 75559

Log	Description	Code	Analysis	Result	Det. Limit	Units	Sample Da	Start Date	Complete	Analyst
310202B	MW-4(11.5-12)	G10PA	Benzo(a)pyrene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benzo(b)fluoranthene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Benzo(ghi)perylene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Chrysene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Fluorene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Phenanthrene	ND	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	G10PA	Pyrene	260 J	410	ug/kg-dry	05/29/03	06/11/03	06/11/03	SAB
310202B	MW-4(11.5-12)	S06	WATER BY EVAP	17.9		% as received	05/29/03	06/11/03	06/11/03	MJS
310203	TB	G01PA	Benzene	ND	5	ug/L	05/28/03	06/10/03	06/10/03	PSS
310203	TB	G01PA	Naphthalene	ND	5	ug/L	05/28/03	06/10/03	06/10/03	PSS

Methods Used for Summary# 75559:

Code	Description
760	Ext.Proc.-Sonication BN (Solids) SW 846 Method 3550B-mod.
G01PA	SW-846 5035/8260B/PA UST VOCs - BTEX;Cumene;Naph.;EDB;EDC
G10PA	SW-846 8270/PA UST PAHs
S06	Water by evaporation/ EPA-600 Mtd 160.3

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December 5, 2007

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-846 (PA Registration #114A)**
Tank Closure, Confirmatory Sampling Activities Report
Sunoco, Inc. (R&M) –Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID# 51-19781

Dear Mr. Rosendorn:

This letter summarizes the confirmatory sampling activities that were conducted in the vicinity of aboveground storage tank (AST) PB-846. The project site is located at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Confirmatory sampling activities were conducted for the closure of AST PB-846. A Pennsylvania Department of Environmental Protection (PADEP) Aboveground Storage Tank System Closure Notification form was submitted to the PADEP on May 25, 2006 by SUNOCO.

Soil Sampling Activities

AST PB-846 is a 150-foot diameter AST that previously contained crude oil. For ASTs with a diameter greater than 90 feet, the PADEP Closure Requirements for Aboveground Storage Tank Systems (Closure Requirements) specifies the collection of soil samples from both the perimeter of the AST and from below the AST is to be determined upon consultation with the DEP regional office. Per conversation with Walter Payne of PADEP the samples were collected in accordance with the PADEP Closure Requirements for ASTs that are 60 to 90 feet in diameter. As a result of previous unsuccessful attempts to collect soil samples with a hand auger from below the center of other ASTs, an Alternative Confirmatory Sampling Plan for AST Closures (Alternative Plan) was submitted by SUNOCO to PADEP on March 16, 2006. The Alternative Plan proposed to collect three soil samples from angled drilling in lieu of sampling directly beneath the AST. The angled drilling would take place external to the tank shell and would be directed towards the center of the tank to a vertical depth of at least five feet. The Alternative Plan was approved by Walter Payne of PADEP in an April 5, 2006 letter

with the stipulation that the number of soil samples to be collected matched the number of soil samples specified in the Closure Requirements.

A total of six perimeter soil samples (846-Perimeter-1, 846-Perimeter-2, and 846-Perimeter-3, 846-Perimeter-4, 846-Perimeter-5, and 846-Perimeter-6) and three angled soil samples (846-Sub-1, 846-Sub-2, and 846-Sub-3) were collected using a truck mounted Geoprobe® rig. Soil samples 846-Perimeter-1 through 846-Perimeter-6 were collected at a depth of approximately three feet below grade (fbg). Soil samples 846-Sub-1 through 846-Sub-3 were collected at a vertical depth of approximately five fbg (the borings were advanced 7 feet at a 45° angle under AST PB-846).

As per the Closure Requirements at least one soil sample must be collected from aboveground or underground piping, biased towards pipe junctures/joints and control valves. A total of seven soil samples were collected from three underground pipelines at AST PB-846. Using a truck mounted Geoprobe® rig, to obtain soil samples from the three underground pipes, soil samples (AST-846-Line-1, AST-846- Line -2, AST-846-Line -3, AST-846- Line -4, AST-846- Line -5 and AST-846- Line -6). Soil sampling locations are depicted on **Figure 2**.

Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil (with the exception of lead) in soils. The list includes the analyses of benzene, toluene, ethlybenzene, cumene and naphthalene by EPA Method 8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP developed MSCs for soils are based on direct contact exposure scenarios and MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs, or Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended regarding the closure-in-place for AST PB-845.

A copy of the PADEP Aboveground Storage Tank System Closure Report Form is included in **Appendix B**.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

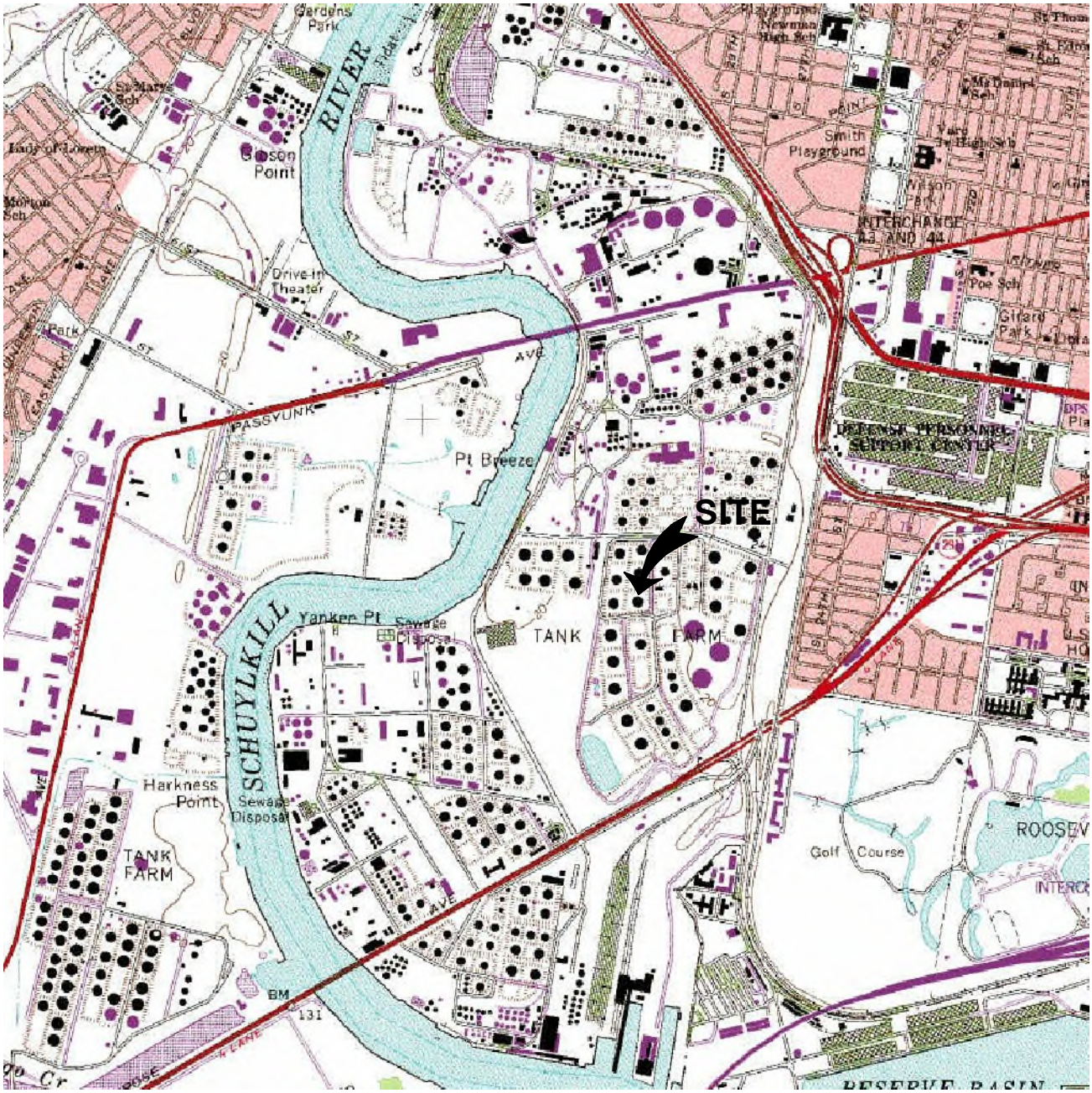
Sincerely,
SECOR International Incorporated

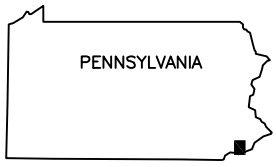
Casey Yetman

Casey Yetman
Project Manager

cc: Project File

FIGURES





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

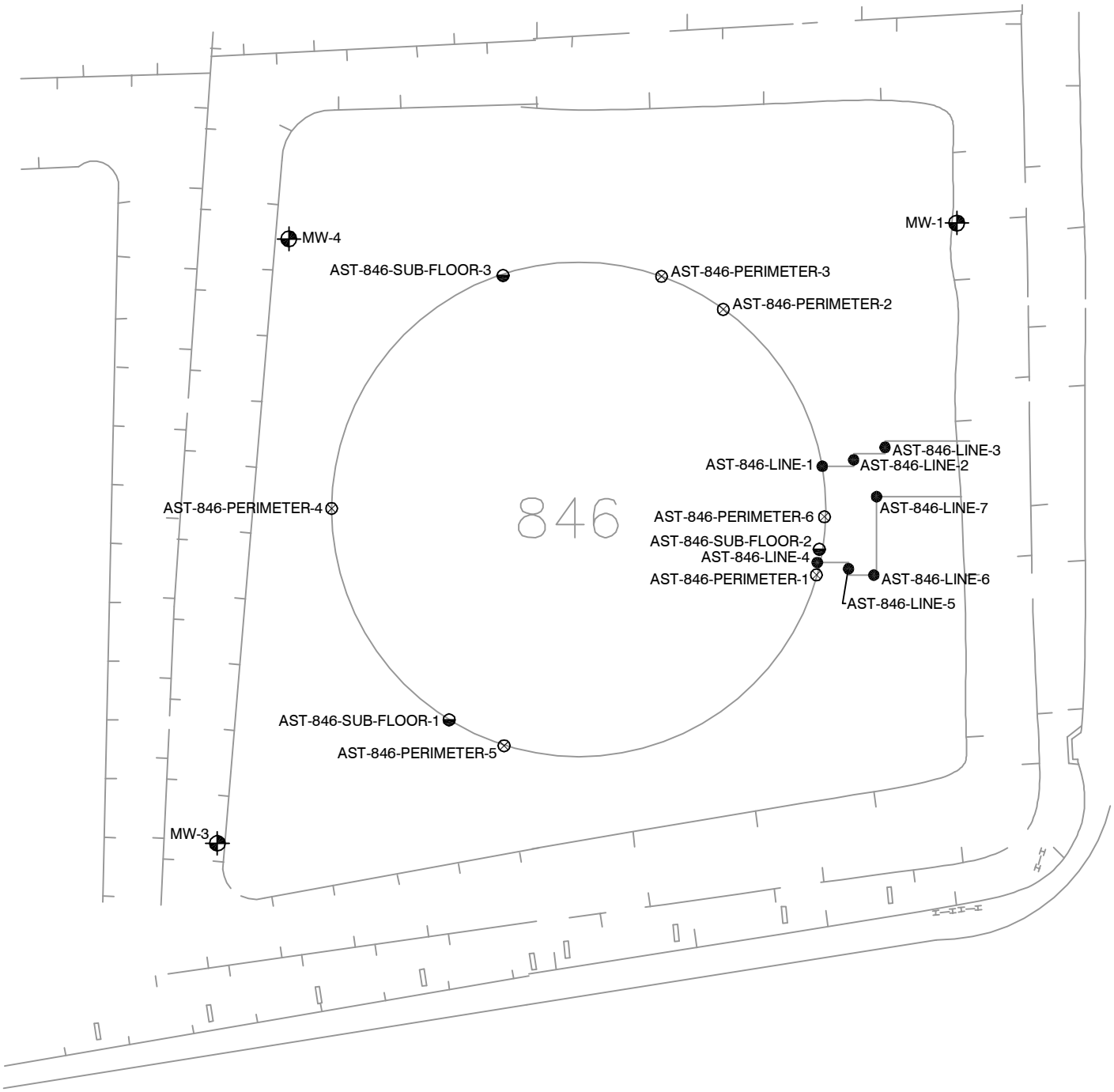
SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:
SUNOCO, INC.
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

SITE LOCATION MAP
FORMER TANK PB-846 AREA

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	TFB	CY		04/17/2006



N

0 50 100

APPROXIMATE SCALE IN FEET

AST-832-LINE-2

LEGEND

- LINE SAMPLE
- PERIMETER SAMPLE
- SUB-FLOOR SAMPLE
- SHALLOW MONITORING WELL

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR:
SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

PB-846
CLOSURE SAMPLING LOCATIONS

FIGURE: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01186.06/0003	KEF	CY		01/08/2007

TABLES

Table 1
Summary of Soil Analytical Results
AST PB-846
Sunoco Philadelphia Refinery

Sample Identification	MSCs			846-Perimeter-1	846-Perimeter-2	846-Perimeter-3	846-Perimeter-4	846-Perimeter-5	846-Perimeter-6	846-Sub-1	846-Sub-2
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	5-5.5	5-5.5
Sample Collection Date				8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006
VOCs											
Benzene	210,000	240,000	500	**5,000**	39 J	ND (27)	ND (28)	ND (26)	120 J	ND (25)	ND (25)
Toluene	10,000,000	10,000,000	100,000	280	ND (52)	ND (54)	ND (57)	ND (52)	ND (52)	ND (49)	ND (50)
Ethylbenzene	10,000,000	10,000,000	70,000	1,800	ND (52)	ND (54)	ND (57)	ND (52)	63 J	ND (49)	ND (50)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	6,500	ND (52)	ND (54)	ND (57)	ND (52)	63 J	ND (49)	ND (50)
Naphthalene	56,000,000	190,000,000	25,000	2,300	95 J	160 J	ND (57)	ND (52)	1,100	ND (49)	ND (50)
SVOCs											
Anthracene	190,000,000	190,000,000	350,000	2,000	86 J	1,500	190 J	ND (39)	2,000	ND (38)	ND (36)
Benzo(a)anthracene	110,000	190,000,000	320,000	3,400	170 J	3,900	1,300	ND (39)	3,500	ND (38)	ND (36)
Benzo(a)pyrene	11,000	190,000,000	46,000	2,600	160 J	3,300	1,400	ND (39)	2,400	ND (38)	ND (36)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	3,100	260	4,400	1,800	ND (39)	3,200	ND (38)	ND (36)
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	1,400	200	1,800	630	ND (39)	1,400	ND (38)	ND (36)
Chrysene	11,000,000	190,000,000	230,000	4,000	280	3,600	1,100	ND (39)	3,400	ND (38)	ND (36)
Fluorene	110,000,000	190,000,000	3,800,000	4,200	90 J	570	110 J	ND (39)	1,700	ND (38)	ND (36)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	1,400	130 J	1,900	730	ND (39)	1,400	ND (38)	ND (36)
Phenanthrene	190,000,000	190,000,000	10,000,000	9,300	300	4,900	690	ND (39)	9,100	ND (38)	ND (36)
Pyrene	84,000,000	190,000,000	2,200,000	4,100	350	6,300	1,100	ND (39)	7,200	ND (38)	ND (36)

Sample Identification	MSCs			846-Sub-3	AST-846-LINE-1	AST-846-LINE-2	AST-846-LINE-3	AST-846-LINE-4	AST-846-LINE-5	AST-846-LINE-6	AST-846-LINE-7
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	5-5.5	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6
Sample Collection Date				8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006	8/24/2006
VOCs											
Benzene	210,000	240,000	500	27 J	ND (26)	ND (27)	ND (28)	37 J	220 J	120 J	29 J
Toluene	10,000,000	10,000,000	100,000	ND (53)	ND (51)	ND (54)	ND (55)	ND (59)	120 J	100 J	ND (56)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (53)	ND (51)	ND (54)	ND (55)	ND (59)	620	ND (52)	ND (56)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (53)	ND (51)	ND (54)	ND (55)	160 J	290	ND (52)	ND (56)
Naphthalene	56,000,000	190,000,000	25,000	160 J	140 J	ND (54)	ND (55)	140 J	760	62 j	100 J
SVOCs											
Anthracene	190,000,000	190,000,000	350,000	1,600	38 J	ND (36)	ND (39)	120 J	160 J	240	220
Benzo(a)anthracene	110,000	190,000,000	320,000	3,800	66 J	ND (36)	ND (39)	100 J	380	370	580
Benzo(a)pyrene	11,000	190,000,000	46,000	2,900	50 J	ND (36)	ND (39)	38 J	320	200	490
Benzo(b)fluoranthene	110,000	190,000,000	170,000	3,600	63 J	ND (36)	ND (39)	61 J	430	300	650
Benzo(ghi)perylene	170,000,000	190,000,000	180,000	2,000	ND (35)	ND (36)	ND (39)	ND (36)	210	120 J	340
Chrysene	11,000,000	190,000,000	230,000	3,700	67 J	ND (36)	ND (39)	290	510	850	550
Fluorene	110,000,000	190,000,000	3,800,000	1,100	ND (35)	ND (36)	ND (39)	730	380	550	140 J
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	1,800	ND (35)	ND (36)	ND (39)	ND (36)	200	96 J	330
Phenanthrene	190,000,000	190,000,000	10,000,000	6,200	120 J	ND (36)	ND (39)	1,900	1,600	1,400	730
Pyrene	84,000,000	190,000,000	2,200,000	6,400	120 J	45 J	ND (39)	300	680	880	1,000

Notes:
FBG = Feet Below Grade
All concentrations are in ug/kg (micrograms per kilogram)
ND (30) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Laboratory Analytical Report

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:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1003269. Samples arrived at the laboratory on Friday, August 25, 2006.

Client Description	Lancaster Labs Number
846 Perimeter 1 Grab Soil Sample	4851957
846 Perimeter 2 Grab Soil Sample	4851958
846 Perimeter 3 Grab Soil Sample	4851959
846 Perimeter 4 Grab Soil Sample	4851960
846 Perimeter 5 Grab Soil Sample	4851961
846 Perimeter 6 Grab Soil Sample	4851962
846 Line 1 Grab Soil Sample	4851963
846 Line 2 Grab Soil Sample	4851964
846 Line 3 Grab Soil Sample	4851965
846 Line 4 Grab Soil Sample	4851966
846 Line 5 Grab Soil Sample	4851967
846 Line 6 Grab Soil Sample	4851968
846 Sub 1 Grab Soil Sample	4851969
846 Sub 2 Grab Soil Sample	4851970
846 Sub 3 Grab Soil Sample	4851971
846 Line 7 Grab Soil Sample	4851972

1 COPY TO SECOR International, Inc Attn: Casey Yetman

Lancaster Laboratories

Analysis Report

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Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Rachel R. Cochis
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851957

846 Perimeter 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 10:17 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	12.7	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	4,100.	38.	ug/kg	1
03768	Fluorene	86-73-7	4,200.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	9,300.	190.	ug/kg	5
03776	Anthracene	120-12-7	2,000.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	3,400.	38.	ug/kg	1
03782	Chrysene	218-01-9	4,000.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	3,100.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	2,600.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,400.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,400.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	5,000.	27.	ug/kg	46.55
05466	Toluene	108-88-3	280.	53.	ug/kg	46.55
05474	Ethylbenzene	100-41-4	1,800.	53.	ug/kg	46.55
05479	Isopropylbenzene	98-82-8	6,500.	53.	ug/kg	46.55
05498	Naphthalene	91-20-3	2,300.	53.	ug/kg	46.55

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 05:44	Linda M Hartenstine	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 16:11	Ryan P Byrne	5

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Analysis Report

Lancaster Laboratories Sample No. SW 4851957

846 Perimeter 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 10:17 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P1

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 04:05	Seth J Good	46.55
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:18	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/28/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851958

846 Perimeter 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:52 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	350.		39.	ug/kg	1
03768	Fluorene	86-73-7	90.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	300.		39.	ug/kg	1
03776	Anthracene	120-12-7	86.	J	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	170.	J	39.	ug/kg	1
03782	Chrysene	218-01-9	280.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	260.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	160.	J	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	130.	J	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	200.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	39.	J	26.	ug/kg	44.52
05466	Toluene	108-88-3	N.D.		52.	ug/kg	44.52
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	44.52
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	44.52
05498	Naphthalene	91-20-3	95.	J	52.	ug/kg	44.52

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 02:51	Michele J Smith	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 04:51	Seth J Good	44.52

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4851958

846 Perimeter 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:52 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:19	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851959

846 Perimeter 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:47 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.6		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	6,300.		190.	ug/kg	5
03768	Fluorene	86-73-7	570.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	4,900.		190.	ug/kg	5
03776	Anthracene	120-12-7	1,500.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	3,900.		39.	ug/kg	1
03782	Chrysene	218-01-9	3,600.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	4,400.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	3,300.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,900.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,800.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		27.	ug/kg	46.47
05466	Toluene	108-88-3	N.D.		54.	ug/kg	46.47
05474	Ethylbenzene	100-41-4	N.D.		54.	ug/kg	46.47
05479	Isopropylbenzene	98-82-8	N.D.		54.	ug/kg	46.47
05498	Naphthalene	91-20-3	160.	J	54.	ug/kg	46.47

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 03:54	Michele J Smith	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 12:54	Mark A Clark	5

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Analysis Report

Lancaster Laboratories Sample No. SW 4851959

846 Perimeter 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:47 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846P3

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 05:13	Seth J Good	46.47
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:20	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851960

846 Perimeter 4 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,100.		39.	ug/kg	1
03768	Fluorene	86-73-7	110.	J	39.	ug/kg	1
03775	Phenanthrene	85-01-8	690.		39.	ug/kg	1
03776	Anthracene	120-12-7	190.	J	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	1,300.		39.	ug/kg	1
03782	Chrysene	218-01-9	1,100.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	1,800.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	1,400.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	730.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	630.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	49.16
05466	Toluene	108-88-3	N.D.		57.	ug/kg	49.16
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	49.16
05479	Isopropylbenzene	98-82-8	N.D.		57.	ug/kg	49.16
05498	Naphthalene	91-20-3	N.D.		57.	ug/kg	49.16

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:15	Michele J Smith	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 05:36	Seth J Good	49.16

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Analysis Report

Lancaster Laboratories Sample No. SW 4851960

846 Perimeter 4 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:43 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:21	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851961

846 Perimeter 5 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:39 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P5

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.4	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	26.	ug/kg	43.94
05466	Toluene	108-88-3	N.D.	52.	ug/kg	43.94
05474	Ethylbenzene	100-41-4	N.D.	52.	ug/kg	43.94
05479	Isopropylbenzene	98-82-8	N.D.	52.	ug/kg	43.94
05498	Naphthalene	91-20-3	N.D.	52.	ug/kg	43.94

Commonwealth of Pennsylvania Lab Certification No. 36-037

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Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:36	Michele J Smith	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 05:59	Seth J Good	43.94

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Analysis Report

Lancaster Laboratories Sample No. SW 4851961

846 Perimeter 5 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:39 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:22	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851962

846 Perimeter 6 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:35 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	7,200.		200.	ug/kg	5
03768	Fluorene	86-73-7	1,700.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	9,100.		200.	ug/kg	5
03776	Anthracene	120-12-7	2,000.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	3,500.		39.	ug/kg	1
03782	Chrysene	218-01-9	3,400.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	3,200.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	2,400.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,400.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	1,400.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	120.	J	26.	ug/kg	44.44
05466	Toluene	108-88-3	N.D.		52.	ug/kg	44.44
05474	Ethylbenzene	100-41-4	63.	J	52.	ug/kg	44.44
05479	Isopropylbenzene	98-82-8	63.	J	52.	ug/kg	44.44
05498	Naphthalene	91-20-3	1,100.		52.	ug/kg	44.44

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 16:57	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 04:56	Michele J Smith	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 13:15	Mark A Clark	5

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Analysis Report

Lancaster Laboratories Sample No. SW 4851962

846 Perimeter 6 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:35 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846P6

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 06:22	Seth J Good	44.44
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:23	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851963

846 Line 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 08:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	5.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	120.	J	35.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		35.	ug/kg	1
03775	Phenanthrene	85-01-8	120.	J	35.	ug/kg	1
03776	Anthracene	120-12-7	38.	J	35.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	66.	J	35.	ug/kg	1
03782	Chrysene	218-01-9	67.	J	35.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	63.	J	35.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	50.	J	35.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		35.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		35.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		26.	ug/kg	48.26
05466	Toluene	108-88-3	N.D.		51.	ug/kg	48.26
05474	Ethylbenzene	100-41-4	N.D.		51.	ug/kg	48.26
05479	Isopropylbenzene	98-82-8	N.D.		51.	ug/kg	48.26
05498	Naphthalene	91-20-3	140.	J	51.	ug/kg	48.26

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 07:41	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 06:45	Seth J Good	48.26

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Analysis Report

Lancaster Laboratories Sample No. SW 4851963

846 Line 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 08:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:24	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851964

846 Line 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 08:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	45.	J	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		36.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		36.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		27.	ug/kg	50.15
05466	Toluene	108-88-3	N.D.		54.	ug/kg	50.15
05474	Ethylbenzene	100-41-4	N.D.		54.	ug/kg	50.15
05479	Isopropylbenzene	98-82-8	N.D.		54.	ug/kg	50.15
05498	Naphthalene	91-20-3	N.D.		54.	ug/kg	50.15

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 08:02	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 07:08	Seth J Good	50.15

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Analysis Report

Lancaster Laboratories Sample No. SW 4851964

846 Line 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 08:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:25	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851965

846 Line 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 10:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	14.2	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	28.	ug/kg	47.39
05466	Toluene	108-88-3	N.D.	55.	ug/kg	47.39
05474	Ethylbenzene	100-41-4	N.D.	55.	ug/kg	47.39
05479	Isopropylbenzene	98-82-8	N.D.	55.	ug/kg	47.39
05498	Naphthalene	91-20-3	N.D.	55.	ug/kg	47.39

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 08:23	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 07:31	Seth J Good	47.39

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Analysis Report

Lancaster Laboratories Sample No. SW 4851965

846 Line 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 10:45 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L3

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:26	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851966

846 Line 4 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:19 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	7.2		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	300.		36.	ug/kg	1
03768	Fluorene	86-73-7	730.		36.	ug/kg	1
03775	Phenanthrene	85-01-8	1,900.		36.	ug/kg	1
03776	Anthracene	120-12-7	120.	J	36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	100.	J	36.	ug/kg	1
03782	Chrysene	218-01-9	290.		36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	61.	J	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	38.	J	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	37.	J	29.	ug/kg	54.59
05466	Toluene	108-88-3	N.D.		59.	ug/kg	54.59
05474	Ethylbenzene	100-41-4	N.D.		59.	ug/kg	54.59
05479	Isopropylbenzene	98-82-8	160.	J	59.	ug/kg	54.59
05498	Naphthalene	91-20-3	140.	J	59.	ug/kg	54.59

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 08:44	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/05/2006 07:54	Seth J Good	54.59

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Analysis Report

Lancaster Laboratories Sample No. SW 4851966

846 Line 4 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:19 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

846L4

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:27	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851967

846 Line 5 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:25 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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Exton PA 19341

846L5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	680.		39.	ug/kg	1
03768	Fluorene	86-73-7	380.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	1,600.		39.	ug/kg	1
03776	Anthracene	120-12-7	160.	J	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	380.		39.	ug/kg	1
03782	Chrysene	218-01-9	510.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	430.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	320.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	200.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	210.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	220.	J	27.	ug/kg	45.41
05466	Toluene	108-88-3	120.	J	54.	ug/kg	45.41
05474	Ethylbenzene	100-41-4	620.		54.	ug/kg	45.41
05479	Isopropylbenzene	98-82-8	290.		54.	ug/kg	45.41
05498	Naphthalene	91-20-3	760.		54.	ug/kg	45.41

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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

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 09:05	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 13:35	Robin C Runkle	45.41

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Analysis Report

Lancaster Laboratories Sample No. SW 4851967

846 Line 5 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:25 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L5

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:28	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851968

846 Line 6 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:31 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.1		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	880.		35.	ug/kg	1
03768	Fluorene	86-73-7	550.		35.	ug/kg	1
03775	Phenanthrene	85-01-8	1,400.		35.	ug/kg	1
03776	Anthracene	120-12-7	240.		35.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	370.		35.	ug/kg	1
03782	Chrysene	218-01-9	850.		35.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	300.		35.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	200.		35.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	96.	J	35.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	120.	J	35.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	120.	J	26.	ug/kg	48.78
05466	Toluene	108-88-3	100.	J	52.	ug/kg	48.78
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	48.78
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	48.78
05498	Naphthalene	91-20-3	62.	J	52.	ug/kg	48.78

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 09:26	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 13:58	Robin C Runkle	48.78

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Analysis Report

Lancaster Laboratories Sample No. SW 4851968

846 Line 6 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:31 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:04
Discard: 09/26/2006

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846L6

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:29	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851969

846 Sub 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:32 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846S1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	38.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	25.	ug/kg	43.9
05466	Toluene	108-88-3	N.D.	49.	ug/kg	43.9
05474	Ethylbenzene	100-41-4	N.D.	49.	ug/kg	43.9
05479	Isopropylbenzene	98-82-8	N.D.	49.	ug/kg	43.9
05498	Naphthalene	91-20-3	N.D.	49.	ug/kg	43.9

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 19:02	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 09:46	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 14:21	Robin C Runkle	43.9

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Analysis Report

Lancaster Laboratories Sample No. SW 4851969

846 Sub 1 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:32 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846S1

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:30	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851970

846 Sub 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:42 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846S2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	8.1	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	N.D.	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	36.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	36.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	25.	ug/kg	46
05466	Toluene	108-88-3	N.D.	50.	ug/kg	46
05474	Ethylbenzene	100-41-4	N.D.	50.	ug/kg	46
05479	Isopropylbenzene	98-82-8	N.D.	50.	ug/kg	46
05498	Naphthalene	91-20-3	N.D.	50.	ug/kg	46

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 19:02	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 10:07	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 14:43	Robin C Runkle	46

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Analysis Report

Lancaster Laboratories Sample No. SW 4851970

846 Sub 2 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:42 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846S2

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:31	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851971

846 Sub 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:58 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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Exton PA 19341

846S3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	6,400.		120.	ug/kg	3
03768	Fluorene	86-73-7	1,100.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	6,200.		120.	ug/kg	3
03776	Anthracene	120-12-7	1,600.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	3,800.		40.	ug/kg	1
03782	Chrysene	218-01-9	3,700.		40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	3,600.		40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	2,900.		40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	1,800.		40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	2,000.		40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	27.	J	26.	ug/kg	44.29
05466	Toluene	108-88-3	N.D.		53.	ug/kg	44.29
05474	Ethylbenzene	100-41-4	N.D.		53.	ug/kg	44.29
05479	Isopropylbenzene	98-82-8	N.D.		53.	ug/kg	44.29
05498	Naphthalene	91-20-3	160.	J	53.	ug/kg	44.29

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 19:02	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 10:28	Mark A Clark	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 16:24	Mark A Clark	3

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Analysis Report

Lancaster Laboratories Sample No. SW 4851971

846 Sub 3 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 11:58 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846S3

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 15:06	Robin C Runkle	44.29
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:32	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4851972

846 Line 7 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846L7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	11.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,000.		38.	ug/kg	1
03768	Fluorene	86-73-7	140.	J	38.	ug/kg	1
03775	Phenanthrene	85-01-8	730.		38.	ug/kg	1
03776	Anthracene	120-12-7	220.		38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	580.		38.	ug/kg	1
03782	Chrysene	218-01-9	550.		38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	650.		38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	490.		38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	330.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	340.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	29.	J	28.	ug/kg	49.7
05466	Toluene	108-88-3	N.D.		56.	ug/kg	49.7
05474	Ethylbenzene	100-41-4	N.D.		56.	ug/kg	49.7
05479	Isopropylbenzene	98-82-8	N.D.		56.	ug/kg	49.7
05498	Naphthalene	91-20-3	100.	J	56.	ug/kg	49.7

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
00111	Moisture	EPA 160.3 modified	1	08/29/2006 17:49	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	08/31/2006 10:49	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	09/01/2006 15:28	Robin C Runkle	49.7

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Analysis Report

Lancaster Laboratories Sample No. SW 4851972

846 Line 7 Grab Soil Sample

SUN PHL PB 846
Collected:08/24/2006 09:10 by RB

Account Number: 11183

Submitted: 08/25/2006 17:00
Reported: 09/11/2006 at 11:05
Discard: 09/26/2006

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846L7

00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	08/28/2006 17:33	Lisa J Cooke	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	08/29/2006 09:30	Olivia Arosemena	1

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc
Group Number: 1003269
Reported: 09/11/06 at 11:05 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 MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06238SLD026	Sample number(s): 4851957							
Pyrene	N.D.	33.	ug/kg	95		67-116		
Fluorene	N.D.	33.	ug/kg	98		66-115		
Phenanthrene	N.D.	33.	ug/kg	97		70-107		
Anthracene	N.D.	33.	ug/kg	95		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	92		73-111		
Chrysene	N.D.	33.	ug/kg	92		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	76		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	90		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	86		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	88		66-120		
Batch number: 06240SLD026	Sample number(s): 4851958-4851972							
Pyrene	N.D.	33.	ug/kg	107		67-116		
Fluorene	N.D.	33.	ug/kg	99		66-115		
Phenanthrene	N.D.	33.	ug/kg	101		70-107		
Anthracene	N.D.	33.	ug/kg	99		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	95		73-111		
Chrysene	N.D.	33.	ug/kg	95		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	94		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	98		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	96		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	97		66-120		
Batch number: 06241820004B	Sample number(s): 4851957-4851962							
Moisture				100		99-101		
Batch number: 06241820005A	Sample number(s): 4851963-4851968							
Moisture				100		99-101		
Batch number: 06241820005B	Sample number(s): 4851972							
Moisture				100		99-101		
Batch number: 06241820007A	Sample number(s): 4851969-4851971							
Moisture				100		99-101		
Batch number: Q062442AB	Sample number(s): 4851957-4851966							
Benzene	N.D.	25.	ug/kg	98	95	77-119	3	30
Toluene	N.D.	50.	ug/kg	96	94	81-116	2	30
Ethylbenzene	N.D.	50.	ug/kg	94	92	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	89	89	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	74	67	52-121	9	30
Batch number: R062431AB	Sample number(s): 4851967-4851972							
Benzene	N.D.	25.	ug/kg	93	94	77-119	1	30
Toluene	N.D.	50.	ug/kg	93	96	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	92	94	82-115	2	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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003269
Reported: 09/11/06 at 11:05 AM

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Isopropylbenzene	N.D.	50.	ug/kg	86	88	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	72	75	52-121	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: 06238SLD026	Sample number(s): 4851957 UNSPK: P851950								
Pyrene	93	105	28-151	11	30				
Fluorene	97	103	47-126	6	30				
Phenanthrene	98	112	35-144	13	30				
Anthracene	99	102	38-142	3	30				
Benzo(a)anthracene	93	102	41-136	9	30				
Chrysene	91	100	40-135	9	30				
Benzo(b)fluoranthene	84	84	29-151	0	30				
Benzo(a)pyrene	93	99	37-144	6	30				
Indeno(1,2,3-cd)pyrene	88	94	39-141	6	30				
Benzo(g,h,i)perylene	90	95	33-145	5	30				
Batch number: 06240SLD026	Sample number(s): 4851958-4851972 UNSPK: 4851958								
Pyrene	91	107	28-151	15	30				
Fluorene	79	85	47-126	7	30				
Phenanthrene	82	91	35-144	9	30				
Anthracene	82	92	38-142	12	30				
Benzo(a)anthracene	83	97	41-136	14	30				
Chrysene	78	94	40-135	17	30				
Benzo(b)fluoranthene	74	84	29-151	13	30				
Benzo(a)pyrene	78	93	37-144	17	30				
Indeno(1,2,3-cd)pyrene	76	90	39-141	17	30				
Benzo(g,h,i)perylene	77	91	33-145	16	30				
Batch number: 06241820004B	Sample number(s): 4851957-4851962 BKG: P852201								
Moisture						3.2	3.4	6	15
Batch number: 06241820005A	Sample number(s): 4851963-4851968 BKG: P852207								
Moisture						17.3	16.7	3	15
Batch number: 06241820005B	Sample number(s): 4851972 BKG: P852210								
Moisture						16.0	15.3	4	15
Batch number: 06241820007A	Sample number(s): 4851969-4851971 BKG: P852075								
Moisture						8.2	8.2	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.

*- 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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003269
Reported: 09/11/06 at 11:05 AM

Surrogate Quality Control

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06238SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851957	113	87	95
Blank	87	97	108
LCS	87	95	103
MS	84	95	99
MSD	88	99	105
Limits:	47-128	55-123	51-158

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06240SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4851958	94	102	105
4851959	94	102	101
4851960	100	103	108
4851961	95	100	113
4851962	95	98	98
4851963	93	95	104
4851964	90	95	104
4851965	92	96	104
4851966	90	91	95
4851967	90	96	92
4851968	99	97	92
4851969	92	95	102
4851970	95	100	104
4851971	95	98	102
4851972	98	100	101
Blank	94	98	103
LCS	98	104	108
MS	83	87	88
MSD	95	96	103
Limits:	47-128	55-123	51-158

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q062442AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851957	91	88	75	83
4851958	93	90	82	83
4851959	89	87	78	77
4851960	100	96	85	83
4851961	92	90	79	76
4851962	88	85	75	78
4851963	98	97	84	84
4851964	95	93	82	80
4851965	91	88	76	74
4851966	94	94	83	83
Blank	100	98	86	81
LCS	100	96	92	87
LCSD	97	94	91	86
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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1003269
Reported: 09/11/06 at 11:05 AM

Surrogate Quality Control

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: R062431AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4851967	73	79	73	79
4851968	79	85	81	86
4851969	84	92	80	81
4851970	78	85	74	73
4851971	74	81	69*	72
4851972	75	81	72	75
Blank	100	107	98	89
LCS	80	86	80	78
LCSD	88	95	90	86
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.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003269 Sample # 4851957-72

COC # 0133040

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only
FSC:
SCR#:

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

(1)
Client: SECOR Acct. #:
Project Name/#: SUN-PHL PB846 PWSID #:
Project Manager: C. Yetman P.O.#:
Sampler: R. Bower Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5) (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water (Potable / NPDES)	Other	Total # of Containers	Fuel Oil No 4,5,6 + Used Motor Oil (no lead)	Remarks
846 Perimeter 1	8/24	1017	✓		X			2	✓	
846 Perimeter 2	8/24	0952	X		X			2	✓	
846 Perimeter 3	8/24	0947	X		X			2	✓	temp 1.5-4.5°C
846 Perimeter 4	8/24	0943	X		X			2	✓	
846 Perimeter 5	8/24	0939	X		X			2	✓	
846 Perimeter 6	8/24	0935	X		X			2	✓	
846 Line 1	8/24	0845	X		X			2	✓	
846 Line 2	8/24	0810	X		X			2	✓	
846 Line 3	1040 8/24	[illegible]	X		X			2	✓	
846 Line 4	8/24	0919	X		X			2	✓	

(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: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8/25/06	1525
[signature]	8-25-06	1700			
			[signature]	8/25/06	1700

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

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1003269 Sample # 4851957-72

COC # 0133039

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only
FSC: _____
SCR#: _____

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

(1)
Client: SECOR Acct. #: _____
Project Name/#: SUN-PHL PB846 PWSID #: _____
Project Manager: _____ P.O.#: _____
Sampler: _____ Quote #: _____
Name of state where samples were collected: _____

(2) (3) (4) (5) (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water (☐ Potable ☐ NPDES)	Other	Total # of Containers	Fuel Oil No. 4,5,6	Used Motor Oil (no lead)								Remarks	Temperature of samples upon receipt (if requested)
846 line 5	8/24/06	0925	X		X			2	✓										
846 line 6	8/24	0931	X		X			2	✓										
846 ~~line~~ SUB 1	8/24	1132	X		X			2	✓									temp 1.5-4.5°C	
846 SUB 2	8/24	1142	X		X			2	✓										
846 SUB 3	8/24	1158	X		X			2	✓										
846 line 7	8/24	0910	X		X			2	✓										

(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: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
[signature]	8/25/06	1430	[signature]	8-25-06	1525
[signature]	8-25-06	1700			
			[signature]	8/25/06	1700

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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APPENDIX B

PADEP Aboveground Storage Tank System Closure Report Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

51-19781
Facility I.D.

Philadelphia
Municipality

Philadelphia
County

Date Prepared

Ron Rosendorn
Name of Person Submitting Report
(Please Print)

Sunoco, Inc. (R & M)
Company Name
(If Applicable)

Sr. Environmental Engineer
Title

Closure Method (Check all that apply):

- ☒ AST Removal
- ☐ AST Closure-In-Place
- ☐ AST Change-In-Service

Site Assessment Results (Check all that apply):

- ☒ No Obvious Contamination - Sample Results Meet Standards/Levels
- ☐ No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- ☐ Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- ☐ Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DATE RECEIVED: _____

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Owners who are permanently closing aboveground storage tanks may use this form to demonstrate that a storage tank closure was performed in accordance with the "Closure Requirements for Aboveground Storage Tank Systems" document.
PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-19781
2. Facility Name Sunoco, Inc.
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
6. Facility Contact Person Ron Rosendorn
7. Facility Telephone Number (215)
8. Owner Name Sunoco, Inc.
9. Owner Mailing Address 3144 Passyunk Ave, Philadelphia, PA 19145-5299
10. Description of Aboveground Storage Tanks (Complete for each tank closed)

DATE OF TANK CLOSURE (Month/Day/Year)		12/28/06	12/28/06	12/28/06	7/11/06
Tank Registration Number		102A	113A	114A	180A
Estimated Total Capacity (Gallons)		6346200	6346200	6346200	40000
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify	Hvy Gas Oil	Crude Oil	Crude Oil	Catacarb
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☒
	Name of Principal CERCLA Substance				Diethanol amine
	AND				
	Chemical Abstract Service (CAS) No.				111422
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☒	☒	☒	☒
	b. Closure-in-Place	☐	☐	☐	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)		No	No	No	No

DATE OF TANK CLOSURE (Month/Day/Year)					
Tank Registration Number					
Estimated Total Capacity (Gallons)					
Substance(s) Stored Throughout Operating Life of Tank (Check All That Apply)	**a. Petroleum**				
	Unleaded Gasoline	☐	☐	☐	☐
	Leaded Gasoline	☐	☐	☐	☐
	Aviation Gasoline	☐	☐	☐	☐
	Kerosene	☐	☐	☐	☐
	Jet Fuel	☐	☐	☐	☐
	Diesel Fuel	☐	☐	☐	☐
	Fuel Oil No. 1	☐	☐	☐	☐
	Fuel Oil No. 2	☐	☐	☐	☐
	Fuel Oil No. 4	☐	☐	☐	☐
	Fuel Oil No. 5	☐	☐	☐	☐
	Fuel Oil No. 6	☐	☐	☐	☐
	New Motor Oil	☐	☐	☐	☐
	Used Motor Oil	☐	☐	☐	☐
	Other, Please Specify				
NOTE: If Hazardous Substance Block is Checked, Attach Material Safety Data Sheets (MSDS)	**b. Hazardous Substance**	☐	☐	☐	☐
	Name of Principal CERCLA Substance				
	AND				
	Chemical Abstract Service (CAS) No.				
	c. Unknown	☐	☐	☐	☐
Closure Method (Check Only One)	**a. Removal**	☐	☐	☐	☐
	b. Closure-in-Place	☐	☐	☐	☐
	c. Change-In-Service	☐	☐	☐	☐
Partial System Closure (Yes or No)					

Yes **N/A**

☒ ☐ 11. Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of tanks:**

The storage tank facility includes over 100 bulk storage tanks involved with the oil refining process. Most of the tanks contain petroleum feedstocks, intermediates, and refined products. The balance of tanks are chemical additives.

☐ ☒ 12. A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.

☐ ☒ 13. Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).

☒ ☐ 14. An amended "Registration/Permitting of Storage Tanks" form was submitted to the DEP, Bureau of Land Recycling and Waste Management, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 8/3/06 (180A); 12/28/06 (102A, 113A, 114A)

☐ ☒ 15. If a reportable release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: _____ Office: _____

Yes N/A

☒ ☐ 16. If tanks were cleaned on-site:

a. Briefly describe the disposition of usable product: Usable product was transferred to another available on-site product tank.

b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
Non-hazardous tank residue/solids were containerized in roll-off dumpsters and transported to a subtitle D non-hazardous landfill (Grows Landfill - Morrisville, PA) Tanks were cleaned 5+ years ago. Archived waste manifests are kept at Iron Mountain records retention facility.

c. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number: N/A

(2) Licensed Hazardous Waste Transporter Name and ID Number: N/A - not RCRA hazardous at time of cleaning.

☐ ☒ 17. If tanks were removed from the site for cleaning:

a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning:

b. If tank contents were determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):
All steel scrap was taken to International Scrap, Inc.

☐ ☒ 19. If contaminated soil is excavated:

a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):

b. If contaminated soil is determined/deemed to be hazardous waste, provide:

(1) Generator ID Number:

(2) Licensed Hazardous Waste Transporter Name and ID Number:

Yes N/A

☐ ☒ 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

_____

_____

_____

☐ ☒ 21. If the tanks were "Closed-in-Place" provide information below:

a. Briefly describe the tank cleaning process: _____

_____

_____

b. If subcontracted, name and address of company that performed the tank cleaning:

_____

_____

c. How were tanks marked/labeled with permanent closure date: _____

_____

_____

I, Michael G. McKee, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating
(Print Name)
to unsworn falsification to authorities) that I am the owner of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

_____ _____

Signature of Tank Owner Date

Printed on Recycled Paper

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION II. Tank Handling Information

Facility ID Number 51-19781
Tank Registration ID Number(s) 113A

Yes	N/A		
		1.	Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil and debris: N/A
		2.	Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping: Aboveground pipe internals were cleaned using a high pressure water wash. Piping was sent for scrap 6" x 1500'. Piping was in good condition. There was no underground piping.
		3.	Briefly describe the condition of the tanks and any problems encountered during tank handling or tank removal activities: No problems.
		4.	Briefly describe the method used to purge the tanks of and monitor for hazardous or explosive vapors: Tank was flushed with #2 oil and then water washed.
☒	☐	5.	If tanks were cleaned on-site: a. Briefly describe the tank cleaning process: Tank was flushed with #2 oil and then water washed. Oil flush was vacuumed out and delivered to an on site recovered oil tank to be reprocessed into product. Rinse water was vacuumed and transported to an on-site WWTP. b. If subcontracted, name and address of company that performed the tank cleaning: Snow Environmental Services, 227 Pennel Road, Aston, PA
☐	☒	6.	If tanks were closed-in-place, briefly describe how tanks were rendered inoperative, marked permanently closed with date, vented and secured to prevent unauthorized entry: I

SECTION II. (continued)

☐ ☒ 7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

I, Daniel Stabilito (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed the tank handling activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

12/28/06
Date

5371
Installer Certification Number

1643
Company Certification Number

LVI Environmental Services, Inc.
Company Name

415 Boot Road
Street

Downingtown, PA 19335
City/Town, State, Zip

610-518-0303
Phone

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 113A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51-19781

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A: if NOT encountered).

Bedrock N/A feet below land surface Water N/A feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

☒ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records ----------→ Do not complete item C.2. below.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____ ----------→ Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

☐ YES --------→ Remove or remediate contaminated soil --------→ Conduct confirmatory sampling-------→ See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

☐ NO ----------→ Conduct confirmatory sampling ----------→ See end of this section for options on submission and maintenance of closure records.

☐ YES----------→ Report release to DEP within 24 hours ----------→ Describe contamination observed and likely source(s) tank, piping, dispenser, spills, overfills): _____

_____

_____

_____

Continue with corrective action --------→ See end of this section for options on submission and maintenance of closure records. ----------→

E. If the answer to C.1. is "no", the answer to C.2. if "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

(a) By the owners and operators who took the tank system out of service;
(b) By the current owners and operators of the tank system site; or
(c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulation requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Ryan Bower (Print Name), hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.

Signature of Person Performing Site Assessment

12/21/07
Date

Field Geologist
Title of Person Performing Site Assessment

SECOR International, Inc.
Name of Company Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM
CLOSURE REPORT FORM

Sample/Analysis Information
(Attachment for Section III.)
Facility ID Number 51-19781

Sample I.D. (See diagram)	Parameter	Analytical Method[1]		Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
see Table 1								

[1] Where EPA Method 5035 is used, indicate sample collection option in the right hand box of this column using the following codes:

P - Samples placed in a soil sample vial with a preservative present.
E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.
N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large scale map of the site where tanks were closed. Scales between 1" = 10 and 1" = 100 feet frequently work out well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tanks removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: 51 - 19781

County: Philadelphia

Township/Borough: Philadelphia

See FIGURE 1 and FIGURE 2

PB 847

SECOR
SECOR INTERNATIONAL INCORPORATED
www.secor.com
102 Pickering Way, Suite 200
Exton, PA 19341
484-875-3075 TEL
484-875-9286 FAX

January 25, 2007

Ron Rosendorn
Senior Environmental Engineer Specialist
SUNOCO (R&S)
3144 Passyunk Avenue
Philadelphia, Pennsylvania

RE: Tank 847 Soil Sampling
Philadelphia Refinery

Dear Mr. Rosendorn:

This letter summarizes the site assessment activities in response to a release of crude oil within the dike area for tank PB 847. The project site is located within the Sunoco, Inc. (Sunoco) Philadelphia Refinery located in Philadelphia, Pennsylvania (**Figure 1**). As a result of the release, interim remedial activities were conducted by Sunoco, including the excavation of surface soils to a depth of approximately 4" below grade. Site assessment activities were conducted after the excavation of surface soil to determine if additional remedial activities are required to attain standards.

Soil Sampling and Laboratory Analyses

On October 16, 2006 SECOR International (SECOR) collected six soil samples in an area described as the vicinity of the release. All soil samples (designated AST-847-1 (0-0.5) through AST-847-6 (0-0.5)) were collected within the release area at a depth of approximately 0-6 inches below ground surface. Soil sampling locations are depicted on **Figure 2**.

The laboratory analyses selected for the soil samples were based on the material released. As a result, the soil samples were analyzed for Pennsylvania Department of Environmental Protection (PADEP) Pennsylvania Land Recycling Program (Act 2) short list of parameters for fuel oil 4, 5, 6 and waste oil in soils plus total xylenes. The list includes the analyses of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and isopropylbenzene by EPA Method 8260B, pyrene, fluorene, phenanthrene, anthracene, benzo(a)anthracene, chysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene by EPA Method 8270C, and lead by EPA Method 6010B.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater. Soil sample results were compared to the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B and Tables 4A and 4B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil Direct Contact MSCs, Nonresidential Subsurface Soil Direct Contact MSCs, or the Use Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Six soil samples were collected in the area of release, AST-847-1 (0-0.5) through AST-847-6 (0-0.5). None of the soil samples collected exceeded the Nonresidential Surface Soil Direct Contact MSCs, Nonresidential Subsurface Soil Direct Contact MSCs, or the Use Aquifer Nonresidential Soil-to-Groundwater MSCs. The analytical data indicates that the interim remedial activities conducted by Sunoco were sufficient; no additional remedial activities are required.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

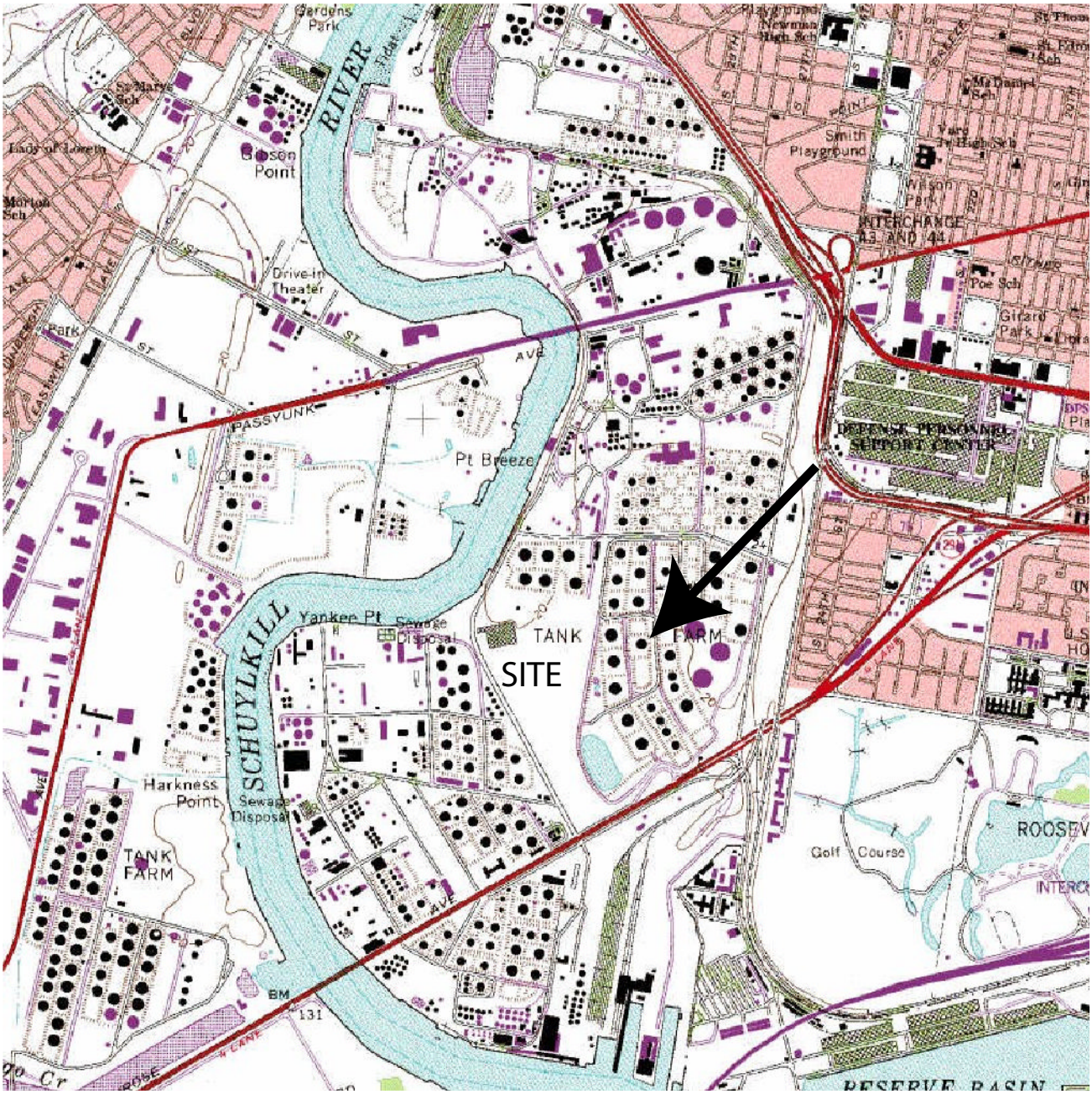
Sincerely,
SECOR International Incorporated

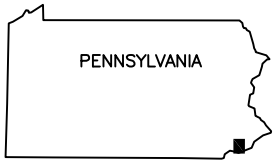
Casey Yetman
Project Manager

Frank Aceto, PG
Principal Hydrogeologist

Cc: Jim Oppenheim (Sunoco)
Project File

Figures





QUADRANGLE LOCATION

N

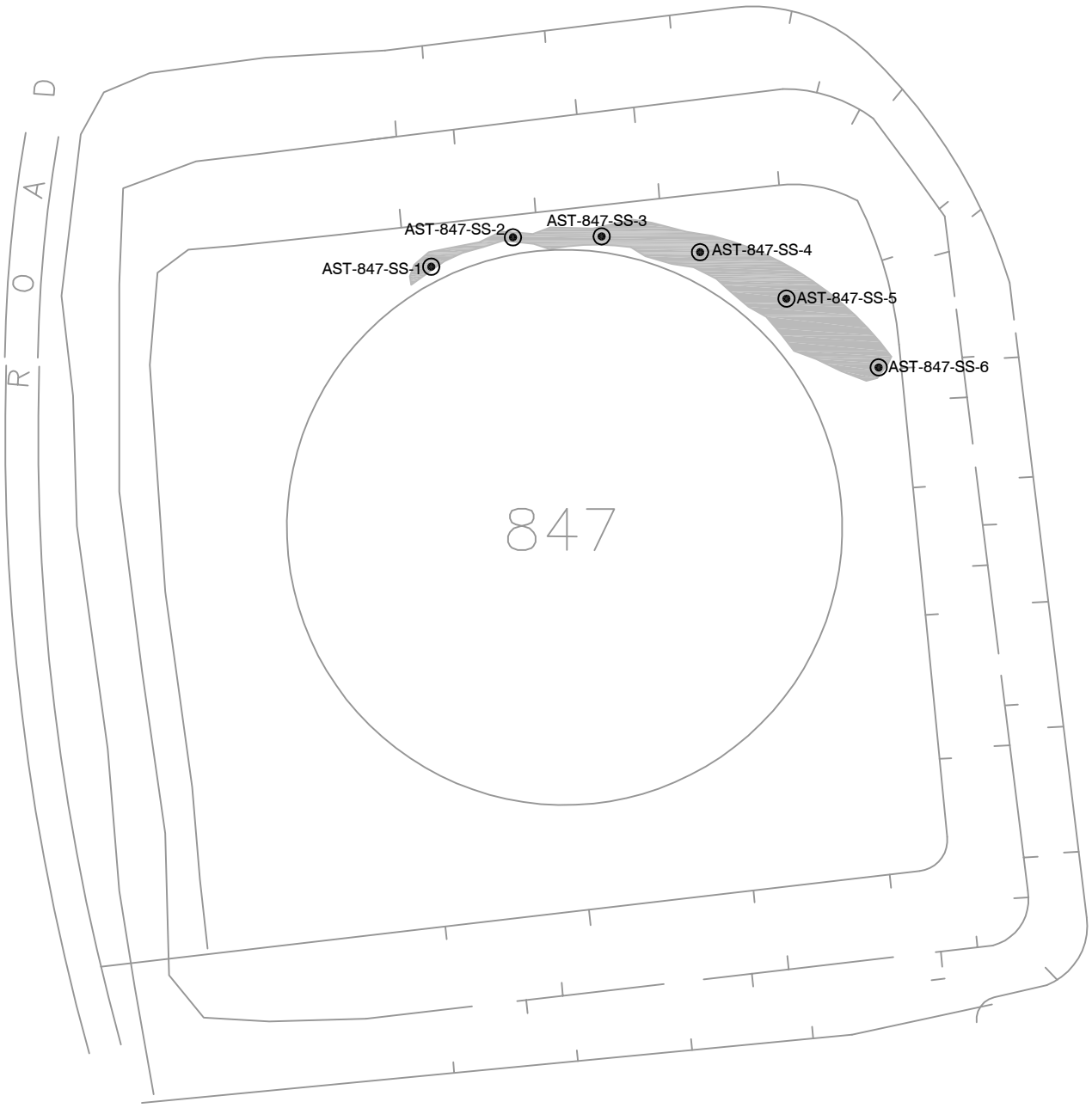
0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:		SITE LOCATION MAP PHILADELPHIA REFINERY		FIGURE: 1
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA				
JOB NUMBER: 62SU.01095	DRAWN BY: KEF	CHECKED BY: CY	APPROVED BY:	DATE: 04/17/2006



N

0 50 100

APPROXIMATE SCALE IN FEET

LEGEND

POST-EXCAVATION SAMPLE

INDICATES AREA IMPACTED BY RELEASE

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR:			FIGURE:
SUNOCO PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA		**AST-847** **POST-EXCAVATION SAMPLE LOCATIONS**	**2**
JOB NUMBER: 62SU.012.07.06/0003	**DRAWN BY:** KEF	**CHECKED BY:** CY	**APPROVED BY:**	**DATE:** 01/25/2007

Table

Table 1
AST PB 847 Soil Sample Analytical Results
Sunoco, Inc. Philadelphia Refinery

Sample ID	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	AST-847-1 (0-0.5)	AST-847-2 (0-0.5)	AST-847-3 (0-0.5)	AST-847-4 (0-0.5)	AST-847-5 (0-0.5)	AST-847-6 (0-0.5)
Sample Date				10/16/2006	10/16/2006	10/16/2006	10/16/2006	10/16/2006	10/16/2006
Benzene	210,000	240,000	500	ND (28)	ND (28)	ND (27)	ND (28)	ND (28)	ND (28)
Toluene	10,000,000	10,000,000	100,000	ND (56)	ND (57)	ND (54)	ND (57)	ND (55)	ND (56)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (56)	ND (57)	ND (54)	ND (57)	ND (55)	ND (56)
Total Xylene	10,000,000	10,000,000	2,200,000	ND (56)	ND (57)	ND (54)	ND (57)	ND (55)	ND (56)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (56)	ND (57)	ND (54)	ND (57)	ND (55)	ND (56)
Naphthalene	56,000,000	190,000,000	25,000	ND (56)	ND (57)	ND (54)	ND (57)	ND (55)	63 J
Pyrene	84,000,000	190,000,000	1,000,000	50 J	310	ND (38)	ND (39)	85 J	ND (39)
Fluorene	110,000,000	190,000,000	3,800,000	ND (36)	ND (38)	ND (38)	ND (39)	ND (38)	ND (39)
Phenanthrene	190,000,000	190,000,000	10,000,000	43 J	300	ND (38)	ND (39)	81 J	ND (39)
Anthracene	190,000,000	190,000,000	350,000	ND (36)	61 J	ND (38)	ND (39)	ND (38)	ND (39)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (36)	170 J	ND (38)	ND (39)	ND (38)	ND (39)
Chrysene	11,000,000	190,000,000	230,000	79 J	130 J	ND (38)	ND (39)	48 J	ND (39)
Benzo(b)fluoranthene	110,000	190,000,000	170,000	46 J	160 J	ND (38)	ND (39)	43 J	ND (39)
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (36)	180 J	ND (38)	ND (39)	ND (38)	ND (39)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (36)	91 J	ND (38)	ND (39)	ND (38)	ND (39)
Benzo(g,h,i)perylene	170,000,000	190,000,000	180,000	ND (36)	91 J	ND (38)	ND (39)	ND (38)	ND (39)
Lead (mg/kg)	1000	190,000	500	268	185	177	35.1	154	15.8

NOTES:
All results in ug/kg unless other wise noted.
ND = Analyte not detected at or above the method detection limit provided in parenthesis.
J = Analyte was positively identified, but less than the quantitation limit, the associated numerical concentration is the approximate value.
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 1 (Current through June 17, 2006)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

Appendix

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:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1010396. Samples arrived at the laboratory on Wednesday, October 18, 2006. The PO# for this group is AST 847.

Client Description	Lancaster Labs Number
AST-847-1/0-0.5 Grab Soil Sample	4892823
AST-847-2/0-0.5 Grab Soil Sample	4892824
AST-847-3/0-0.5 Grab Soil Sample	4892825
AST-847-4/0-0.5 Grab Soil Sample	4892826
AST-847-5/0-0.5 Grab Soil Sample	4892827
AST-847-6/0-0.5 Grab Soil Sample	4892828

1 COPY TO SECOR International, Inc Attn: Casey Yetman

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

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

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. SW 4892823

AST-847-1/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:20 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

84701

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	268.		0.464	mg/kg	1
00111	Moisture	n.a.	7.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	50.	J	36.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		36.	ug/kg	1
03775	Phenanthrene	85-01-8	43.	J	36.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		36.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		36.	ug/kg	1
03782	Chrysene	218-01-9	79.	J	36.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	46.	J	36.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		36.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		36.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		36.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	51.33
05466	Toluene	108-88-3	N.D.		56.	ug/kg	51.33
05474	Ethylbenzene	100-41-4	N.D.		56.	ug/kg	51.33
05479	Isopropylbenzene	98-82-8	N.D.		56.	ug/kg	51.33
05498	Naphthalene	91-20-3	N.D.		56.	ug/kg	51.33
06301	Xylene (Total)	1330-20-7	N.D.		56.	ug/kg	51.33

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	10/24/2006 00:02	John P Hook	1

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4892823

AST-847-1/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:20 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

84701

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 12:07	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 17:18	Kerri E Koch	51.33
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:46	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/21/2006 12:10	Mirit S Shenouda	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4892824

AST-847-2/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:30 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

84702

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	185.		0.493	mg/kg	1
00111	Moisture	n.a.	13.1		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	310.		38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		38.	ug/kg	1
03775	Phenanthrene	85-01-8	300.		38.	ug/kg	1
03776	Anthracene	120-12-7	61.	J	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	170.	J	38.	ug/kg	1
03782	Chrysene	218-01-9	130.	J	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	160.	J	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	180.	J	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	91.	J	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	91.	J	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	49.36
05466	Toluene	108-88-3	N.D.		57.	ug/kg	49.36
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	49.36
05479	Isopropylbenzene	98-82-8	N.D.		57.	ug/kg	49.36
05498	Naphthalene	91-20-3	N.D.		57.	ug/kg	49.36
06301	Xylene (Total)	1330-20-7	N.D.		57.	ug/kg	49.36

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	10/20/2006 06:13	Eric L Eby	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892824

AST-847-2/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:30 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84702

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 13:01	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 17:43	Kerri E Koch	49.36
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:44	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/19/2006 20:10	Annamaria Stipkovits	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892825

AST-847-3/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:40 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84703

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	177.	0.497	mg/kg	1
00111	Moisture	n.a.	11.2	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	38.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	38.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	27.	ug/kg	47.62
05466	Toluene	108-88-3	N.D.	54.	ug/kg	47.62
05474	Ethylbenzene	100-41-4	N.D.	54.	ug/kg	47.62
05479	Isopropylbenzene	98-82-8	N.D.	54.	ug/kg	47.62
05498	Naphthalene	91-20-3	N.D.	54.	ug/kg	47.62
06301	Xylene (Total)	1330-20-7	N.D.	54.	ug/kg	47.62

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	10/24/2006 00:07	John P Hook	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892825

AST-847-3/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:40 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84703

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 13:54	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 18:08	Kerri E Koch	47.62
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:43	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/21/2006 12:10	Mirit S Shenouda	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892826

AST-847-4/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:50 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84704

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	35.1	0.516	mg/kg	1
00111	Moisture	n.a.	15.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	28.	ug/kg	48.12
05466	Toluene	108-88-3	N.D.	57.	ug/kg	48.12
05474	Ethylbenzene	100-41-4	N.D.	57.	ug/kg	48.12
05479	Isopropylbenzene	98-82-8	N.D.	57.	ug/kg	48.12
05498	Naphthalene	91-20-3	N.D.	57.	ug/kg	48.12
06301	Xylene (Total)	1330-20-7	N.D.	57.	ug/kg	48.12

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	10/24/2006 00:11	John P Hook	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892826

AST-847-4/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 19:50 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84704

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 14:48	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 18:33	Kerri E Koch	48.12
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:42	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/21/2006 12:10	Mirit S Shenouda	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892827

AST-847-5/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 20:00 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84705

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	154.		0.492	mg/kg	1
00111	Moisture	n.a.	12.2		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	85.	J	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		38.	ug/kg	1
03775	Phenanthrene	85-01-8	81.	J	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		38.	ug/kg	1
03782	Chrysene	218-01-9	48.	J	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	43.	J	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	48.4
05466	Toluene	108-88-3	N.D.		55.	ug/kg	48.4
05474	Ethylbenzene	100-41-4	N.D.		55.	ug/kg	48.4
05479	Isopropylbenzene	98-82-8	N.D.		55.	ug/kg	48.4
05498	Naphthalene	91-20-3	N.D.		55.	ug/kg	48.4
06301	Xylene (Total)	1330-20-7	N.D.		55.	ug/kg	48.4

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	10/24/2006 00:16	John P Hook	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892827

AST-847-5/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 20:00 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84705

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 15:41	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 18:57	Kerri E Koch	48.4
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:40	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/21/2006 12:10	Mirit S Shenouda	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892828

AST-847-6/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 20:10 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84706

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
06955	Lead	7439-92-1	15.8		0.505	mg/kg	1
00111	Moisture	n.a.	15.3		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	47.48
05466	Toluene	108-88-3	N.D.		56.	ug/kg	47.48
05474	Ethylbenzene	100-41-4	N.D.		56.	ug/kg	47.48
05479	Isopropylbenzene	98-82-8	N.D.		56.	ug/kg	47.48
05498	Naphthalene	91-20-3	63.	J	56.	ug/kg	47.48
06301	Xylene (Total)	1330-20-7	N.D.		56.	ug/kg	47.48

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	10/24/2006 00:21	John P Hook	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4892828

AST-847-6/0-0.5 Grab Soil Sample

AST 847
Collected:10/16/2006 20:10 by CY

Account Number: 11183

Submitted: 10/18/2006 09:05
Reported: 10/26/2006 at 09:37
Discard: 11/10/2006

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84706

00111	Moisture	EPA 160.3 modified	1	10/19/2006 18:35	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	10/24/2006 16:35	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/23/2006 19:22	Kerri E Koch	47.48
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/19/2006 08:38	Larry E Bevins	n.a.
05708	SW SW846 ICP Digest	SW-846 3050B	1	10/21/2006 12:10	Mirit S Shenouda	1
07806	BNA Soil Extraction	SW-846 3550B	1	10/22/2006 11:30	Olivia I Santiago	1

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Analysis Report

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1010396
Reported: 10/26/06 at 09:37 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 MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 062925708002	Sample number(s): 4892824							
Lead	N.D.	0.441	mg/kg	96		82-118		
Batch number: 06292820005A	Sample number(s): 4892823-4892828							
Moisture				100	100	99-101	0	1
Batch number: 06293SLD026	Sample number(s): 4892823-4892828							
Pyrene	N.D.	33.	ug/kg	95		67-116		
Fluorene	N.D.	33.	ug/kg	101		66-115		
Phenanthrene	N.D.	33.	ug/kg	98		70-107		
Anthracene	N.D.	33.	ug/kg	96		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	91		73-111		
Chrysene	N.D.	33.	ug/kg	91		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	86		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	90		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	85		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	88		66-120		
Batch number: 062945708002	Sample number(s): 4892823,4892825-4892828							
Lead	N.D.	0.441	mg/kg	98		82-118		
Batch number: Q062961AB	Sample number(s): 4892823-4892828							
Benzene	N.D.	25.	ug/kg	97	95	77-119	1	30
Toluene	N.D.	50.	ug/kg	96	94	81-116	2	30
Ethylbenzene	N.D.	50.	ug/kg	95	94	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	94	94	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	98	96	52-121	3	30
Xylene (Total)	N.D.	50.	ug/kg	96	94	82-117	2	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: 062925708002	Sample number(s): 4892824 UNSPK: P892229 BKG: P892229								
Lead	(2)	(2)	75-125	5	20	882.	937.	6	20
Batch number: 06292820005A	Sample number(s): 4892823-4892828 BKG: P892757								
Moisture						26.2	25.6	2	15
Batch number: 06293SLD026	Sample number(s): 4892823-4892828 UNSPK: P891531								
Pyrene	76	75	28-151	1	30				
Fluorene	104	96	47-126	8	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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1010396
Reported: 10/26/06 at 09:37 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
Phenanthrene	91	90	35-144	2	30				
Anthracene	88	90	38-142	3	30				
Benzo(a)anthracene	84	82	41-136	1	30				
Chrysene	83	81	40-135	2	30				
Benzo(b)fluoranthene	80	77	29-151	3	30				
Benzo(a)pyrene	85	81	37-144	4	30				
Indeno(1,2,3-cd)pyrene	73	68	39-141	6	30				
Benzo(g,h,i)perylene	70	67	33-145	4	30				
Batch number: 062945708002	Sample number(s): 4892823,4892825-4892828 UNSPK: P891529 BKG: P891529								
Lead	(2)	(2)	75-125	16	20	480.	485.	1	20

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed
unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PAHs in Soil by GC/MS
Batch number: 06293SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4892823	98	113	93
4892824	94	108	99
4892825	98	115	101
4892826	95	119	104
4892827	96	114	108
4892828	92	107	102
Blank	99	102	90
LCS	93	97	98
MS	92	111	94
MSD	89	108	98
Limits:	47-128	55-123	51-158

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q062961AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4892823	90	88	88	87
4892824	85	84	84	83
4892825	84	82	83	82
4892826	85	83	83	83
4892827	84	84	83	83
4892828	81	80	79	78
Blank	94	95	94	91
LCS	97	97	96	96
LCSD	96	97	97	97
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.

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1010396
Reported: 10/26/06 at 09:37 AM

Surrogate Quality Control

*- 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.

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 11183 Group# 1010396 Sample # 4892823-28

COC # 0132848

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: SECOR INTERNATIONAL Acct. #:
Project Name/#: AST 847 PWSID #:
Project Manager: CASEY YETMAN P.O.#:
Sampler: C.Y. Quote #:
Name of state where samples were collected: PA

(4) Matrix: ☐ Potable (Check if Applicable) ☐ NPDES

(5) Analyses Requested — Preservation Codes

For Lab Use Only
FSC:
SCR#:

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

(6) Temperature of samples upon receipt (preservation)

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	Soil	Water	Other	Total # of Containers	FUEL OIL 4,5,+6 AND WASTE OIL PLUS XYLENES PER THE PADEP GASOLINE SHORT LIST
AST-847-1/0-0.5	10-16-06	1920	X		X			2	X
AST-847-2/0-0.5	10-16-06	1930	X		X			2	X
AST-847-3/0-0.5	10-16-06	1940	X		X			2	X
AST-847-4/0-0.5	10-16-06	1950	X		X			2	X
AST-847-5/0-0.5	10-16-06	2000	X		X			2	X
AST-847-6/0-0.5	10-16-06	2010	X		X			2	X
AST-847-7/0-0.5	10-16-06	2020	X		X			2	X

Remarks

ANALYZE PER PADEP GASOLINE SHORTLIST FOR FUEL OIL 4,5+6 AND WASTE OIL PLUS XYLENES

HOLD TILL FURTHER NOTICE AST-847-7/0-0.5

(7) **Turnaround Time Requested** (TAT) (please circle): Normal (Rush)
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: MORNING OF 10-27-06
Rush results requested by (please circle): Phone Fax (E-mail)
Phone #: 484.875.3045 Fax #: 484.875.9286
E-mail address: cyetman@secor.com

(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
Casey Yetman	10/17/06	1200			
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	10/18/06	0905

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.

PB 880 and 881

Philadelphia Refinery

Sent By Telefax 04/16/2004
Certified Mail Return Receipt
7002 0460 0003 1935 2031

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

April 16, 2004

FILE COPY

Mr. Stephan Sinding
PaDEP – S.E. Regional Office
2 East Main Street
Norristown, PA 19401

Storage Tanks PB-880 (PA Registration #119A)
Sunoco, Inc. (R&M) – Point Breeze Process Area
Facility ID #51-19781

Dear Mr. Sinding:

This letter complies with PA Tank Regulations 245.305 reporting releases. On Sunday, April 4, 2004, PaDEP was notified of a release from piping within the emergency containment area of 880 tank. The tank's current status is Temporarily Out of Use.

A Sunoco employee making routine operational checks entered 881tank (PA Registration #120A) dike area and observed oil on the south side of the vessel by the dike wall between shared with 880 tank. The employee then observed a pool of oil in 880 tank dike area. The two tank dike drains are linked and share a common shear gate. The source of the leak was found to be a welded section next to a shoe support on the 30-inch Lateral line to 850 tank (Closed In Place - 02/06/2003) with the oil accumulated within the dike area of 880 tank. The 850 tank manifold was immediately secured. Clean up and recovery work was initiated immediately. Based on engineering calculations and recovery work at the site, an estimated 5,570 barrels of crude oil was lost into the dike area.

A site characterization is to be performed on the site and a report completed within the required time frame.

Should you have any questions or comments in reference to this matter please contact me at 215 339-2074.

Very truly yours,

George A. Keegan
Supervisor Environmental Department

Attachment
GAK/pac

FILE COPY

Cc: Aleta Finney, Solid Waste Specialist, PA DEP

Philadelphia Local Emergency Planning Committee
240 Spring Garden Street
Philadelphia, PA 19123

2530-FM-LRWM0082 Rev. 11/2001

FACILITY I.D. NUMBER 51 - 19781

I. FACILITY INFORMATION (Both O/O and I/I)

Facility Name: Sunoco, Inc. - Point Breeze Process Area
Facility I.D. Number: 51-19781
Street Address (P.O. Box not acceptable): 3144 Passyunk Ave.
City: Philadelphia
State: PA
Zip Code: 19145-5299
County: Philadelphia
Municipality: Philadelphia
Contact Person: Patrick Chabeda
Phone Number: (215) 339 - 2528

II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)

Owner Name: Sunoco Inc.
Address: 3144 Passyunk Ave
City: Philadelphia
State: PA
Zip Code: 19145 - 5299
Phone Number: (215) 339 - 2528
Operator Name: Patrick Chabeda
Phone Number: (215) 339 - 2528

III. REGULATED SUBSTANCE INFORMATION

A. Type of Product(s) Involved (Mark All That Apply ☒): Both O/O and I/I		B. Quantity (Gallons) of Product(s) Released: O/O Only	C. Concentration Suspected [S] or Confirmed [C] (Mark All That Apply ☒): I/I Only
Leaded Gasoline	☐		[S] [C]
Unleaded Gasoline	☐		[S] [C]
Aviation Gasoline	☐		[S] [C]
Kerosene	☐		[S] [C]
Jet Fuel	☐		[S] [C]
Diesel Fuel	☐		[S] [C]
New Motor Oil	☐		[S] [C]
Used Motor Oil	☐		[S] [C]
Fuel Oil No. 1	☐		[S] [C]
Fuel Oil No. 2	☐		[S] [C]
Fuel Oil No. 4	☐		[S] [C]
Fuel Oil No. 5	☐		[S] [C]
Fuel Oil No. 6	☐		[S] [C]
Other (Specify) Crude Oil	☒	2,331,940	[S] [C]
Unknown	☐		[S] [C]

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IV. REPORTABLE RELEASE INFORMATION (O/O Only)

Date Reportable Release was Confirmed: 04 / 04 / 2004 (m / d / y)

Date Owner/Operator Verbally Notified Appropriate Regional Office of Reportable Release and Office Notified:
Date: 04 / 04 / 2004 (m / d / y) Office S.E. Region

Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified:
Date: 04 / 16 / 2004 (m / d / y) Municipality Philadelphia
Date: ___ / ___ / ___ (m / d / y) Municipality ___

Source/Cause (Mark All That Apply ☒):		How Discovered (Mark All That Apply ☒):		Environmental Media Affected and Impacts (Mark All That Apply ☒):	
Tank (DEP Assigned Nos. 119A)	☒	During Closure	☐	Soil	☒
Piping System (Aboveground Regulated)	☒	Lining Installation	☐	Sediment	☐
Piping System (Underground Regulated)	☐	Routine Leak Detection	☐	Surface Water	☐
Piping System (Non-Regulated)	☐	Third Party Inspection	☐	Ground Water	☐
Dispenser/Dispensing Equipment	☐	Tightness Testing Activities	☐	Bedrock	☐
Spill Catchment Basin	☐	Visible Product or Odor Reports	☒	Water Supplies	☐
Accident/Act of God	☐	Water in Tank	☐	Vapors/Product in Buildings	☐
Containment/Sump Failure	☐	Construction	☐	Vapors/Product in Sewer/Utility Lines	☐
Faulty Installation	☐	Upgrade/Repair	☐	Ecological Receptors	☐
Corrosion	☐	Supply Well Sample Results	☐		
Mechanical Failure	☐	Monitoring Well Sample Results	☐		
Spill During Delivery	☐	Property Transfer	☐		
Overfill at Delivery	☐	Other (Specify)	☐		
Vehicle Gas Tank Overfill	☐	Unknown	☐		
Product Delivery Hose Rupture	☐				
Other (Specify)	☐				
Unknown	☐				

2530-FM-LRWM0082 Rev. 11/2001

FACILITY I.D. NUMBER 51 - 19781

V. INTERIM REMEDIAL ACTIONS (O/O Only)

(Mark All That Apply ☒):

	Planned	Initiated	Completed	Not Applicable
Regulated Substance Removed from Storage Tanks	☐	☐	☐	☒
Fire, Explosion and Safety Hazards Mitigated	☐	☐	☒	☐
Contaminated Soil Excavated	☒	☐	☐	☐
Free Product Recovered	☐	☐	☒	☐
Water Supplies Identified and Sampled	☐	☐	☐	☒
Temporary Water Supplies Provided	☐	☐	☐	☒
Other (Specify)	☐	☐	☐	☒

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VI. SUSPECTED / CONFIRMED CONTAMINATION INFORMATION (*I/I* Only)

Date of Observation of Suspected/Confirmed Contamination: 04 (m) / 04 (d) / 2004 (y)

Indication of Suspected Contamination (Mark All That Apply ☒):

- Unusual Level of Vapors ☐
- Erratic Behavior of Product Dispensing Equipment ☐
- Release Detection Results Indicate a Release ☐
- Discovery of Holes in the Storage Tank ☐
- Other (Specify) _____ ☐

Extent of Confirmed Contamination (Mark All That Apply ☒):

- Product Stained or Product Saturated Soil or Backfill ☐
- Ponded Product ☐
- Free Product or Sheen on Ponded Water ☐
- Free Product or Sheen on the Ground Water Surface ☐
- Free Product or Sheen on Surface Water ☐
- Other (Specify) _____ ☐

VII. ADDITIONAL INFORMATION (Both O/O and *I/I*)

Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Provide DEP assigned and owner/operator assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

SUNOCO TANK # PB-881

PA DEP # 119A

Please see attached letter.

2530-FM-LRWM0082 Rev. 11/2001

FACILITY I.D. NUMBER 51 - 19781

VIII. CERTIFICATION (Both O/O and I/I)

I, Patrick A. Chabeda, hereby certify, under penalty of law as provided in 18 Pa
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Owner or Operat

FILE COPY

04 / 16 / 2004
Date

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

/ /
Date

Installer Certification Number

Company Certification Number

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Inspector

/ /
Date

Inspector Certification Number

Company Certification Number

SECOR International Incorporated
Philadelphia Office
102 Pickering Way, Suite 200
Exton, Pennsylvania 19341
Phone: (484) 875-3075
FAX: (484) 875-9286

LETTER OF TRANSMITTAL

Attn: Pat Chabeda **Date:** 10-06-04

Company: Sunoco, Inc.

Address: 3144 Passyunk Avenue
Philadelphia, Pennsylvania 19145

Project: SUNOCO Philadelphia Refinery, Facility ID #51-19781

RE: Site Assessment Report, AST PB-880 (PA Registration #119A) & AST PB-881 (PA Registration #120A)

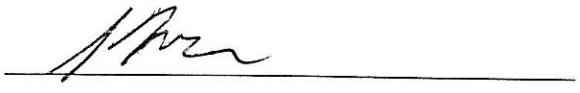
ENCLOSED:
( ) Proposal
( ) Contract
(X) Report
( ) Letter Report
( ) Other:

FOR:
( ) As Requested
( ) Review
(X) Your Information
( ) Approval
( ) Signature
( ) Return
( ) Other:

Comments:

Attached is a copy of the Site Assessment Report. As per your request, the original report was forwarded to Mr. Stephan Sinding at the PADEP. Please call with any questions.

Signature: Sergio Morescalchi
Title: Project Geologist



October 6, 2004

Mr. Pat Chabeda
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Storage Tanks PB-880 & PB-881 (PA Registration #119A & 120A) Site Assessment Report**
Sunoco, Inc. (R&M) – Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID #51-19781

Dear Mr. Chabeda:

This letter summarizes the site assessment activities that were conducted in the vicinity of aboveground storage tank (AST) PB-880 and AST PB-881 at the SUNOCO, Inc. (SUNOCO) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Site assessment activities consisted of confirmation surface soil sampling after remedial activities were completed.

On April 4, 2004, approximately 233,940 gallons of crude oil were released to the ground surface within the AST 880 tank dike area. The crude oil was released from a welded section next to a shoe support on the 30-inch lateral line to AST 850 that runs through the AST 880 tank dike area. Because the AST 880 and AST 881 tank dike drains are linked and share a common shear gate, some of the released crude oil flowed into a drainage grate in the AST 880 tank dike area, through the connecting conduit and emerged through a drainage grate in the adjoining AST 881 tank dike area. The AST 850 tank manifold was immediately secured and the crude oil was removed by vacuum trucks and processed. Approximately 279 tons of contaminated soil was excavated and disposed by Waste Management, Inc. Sunoco notified the Pennsylvania Department of Environmental Protection (PADEP) of the release and subsequent remedial activities in a letter dated April 16, 2004. The approximate extent of the crude oil release is depicted on **Figure 2**. As indicated on **Figure 2** and noted above, the crude oil that was released was confined to within the tank berms of ASTs 880 and 881.

Soil Sampling Activities

On April 8, April 21 and September 7, 2004, a SECOR International Incorporated (SECOR) Professional Geologist certified in Pennsylvania collected 14 soil samples from within the AST 880 tank dike area in order to verify that remedial activities were successful. On July 22, 2004, a SECOR Professional Geologist certified in Pennsylvania collected 7 soil samples from within the AST 881

tank dike area in order to verify that remedial activities were successful. All soil samples (designated 880-1 through 880-14 and 881-1 through 881-7) were collected within the release area at a depth of approximately 6 inches below ground surface, except for soil sample 881-7 which was collected from an area just outside of the release area at a depth of approximately 6 inches below ground surface. Soil sampling locations are depicted on **Figure 2**. Each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil in soils. The list includes the analyses of benzene, toluene, ethlybenzene, isopropylbenzene and naphthalene by EPA Method 5035/8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno (1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C (for soil samples 880-1 through 880-13) or EPA Method 8310 (for soil samples 880-14 and 881-1 through 881-7). None of the soil samples were analyzed for total lead. Additional soil was also collected at each AST 881 sample location and at 880-14 to be analyzed using the Synthetic Precipitation Leaching Procedure (SPLP), if needed.

Soil Sampling Results

The soil analytical data for AST 880 and AST 881 are summarized on **Tables 1** and **2**, respectively. Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Nonresidential Used Aquifer Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

Soil samples 880-1 through 880-7, 880-10, 880-12, 880-14, 881-1 through 881-4, 881-6 and 881-7 did not exceed the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or the Nonresidential Used Aquifer Soil-to-Groundwater MSCs.

Soil samples 880-8, 880-9, 880-11 and 880-13 exceeded the Nonresidential, Used Aquifer, Soil-to-Groundwater MSC of 500 micrograms per kilogram (ug/kg) for benzene with concentrations of 580 ug/kg, 3,100 ug/kg, 1,100 ug/kg and 8,000 ug/kg, respectively. A vadose zone model was utilized to evaluate the potential for benzene to reach the groundwater at concentrations exceeding the applicable PADEP MSC in the area of AST 880. Results of the model are discussed in the next section.

Soil sample 881-5 exceeded the Nonresidential, Used Aquifer, Soil-to-Groundwater MSC of 25,000 ug/kg for naphthalene with a concentration of 31,000 ug/kg. Soil sample 881-5 was analyzed for SPLP

naphthalene by EPA Method 8310. SPLP analytical results were compared to PADEP Nonresidential, Used Aquifer MSC's for groundwater. 881-5 did not exceed the Nonresidential, Used Aquifer MSC for naphthalene in groundwater. The SPLP analytical data is summarized on **Table 3.** Copies of the laboratory analytical results are included in **Appendix B.**

Vadose Zone Transport Model

This section presents the general approach, methodology, and preliminary results of the vadose zone transport model for the AST 880 area. This work was completed to evaluate the potential for benzene to reach the groundwater at concentrations exceeding the applicable groundwater PADEP MSC.

Model Selection

For the assessment of fate and transport of the organic contaminants identified at the site a mathematical model capable of simulating transport through the vadose zone was required. Model selection was based upon the following conditions:

- Ability to accurately simulate transport in the vadose zone;
- Acceptance by the regulatory and scientific community; and,
- Ease of use and flexibility of scenarios.

SESOIL Version 3.0 (distributed by General Science Corporation, 1998) operated under the RISKPRO user interface was selected as the numerical code for performing the vadose zone modeling simulations for the site. SESOIL is a one-dimensional vertical transport model which simulates long-term chemical fate in the soil environment. The SESOIL model is based on mass balance and equilibrium partitioning of the chemical between phases (dissolved, sorbed, vapor, and pure).

The SESOIL model provides an efficient method for the analysis of simple contaminant transport scenarios and has been shown to be a useful tool in the evaluation of contaminant fate and transport in relatively uniform environments. The SESOIL model has undergone validation processes and is considered to be a reliable tool. However, as with all groundwater models, simulation results do not represent a unique solution. The model results are a representation of idealized conditions based upon Site-specific and estimated values.

Conceptual model

For transport modeling purposes, a conservative approach was utilized by calculating the maximum residual soil contaminant concentration that would be protective of the MSC in groundwater within the soil pore space immediately above the saturated zone.

The model simulates one-dimensional vertical transport through the unsaturated soil zone. A model

simulation was constructed for the AST 880 area. Conceptually the model consisted of 2 feet (60.96 cm) of soil containing residual contamination for the AST 880 area. Based upon site investigation data, AST 880 is underlain by 24 feet of unsaturated soil (it is assumed that this soil is not impacted).

Properties

The model framework relies upon input parameters that are readily available through site investigation or published sources.

Climate Data

Climate data used to model the hydrological cycle were derived from a local monitoring station (Philadelphia Pt. Bree) as reported by the RISKPRO SESOIL Database. The climatological database contains data reported by the National Weather Service database and represents a long-term average. The climate input data for SESOIL consists of mean monthly air temperature, mean monthly cloud cover, average monthly relative humidity, average monthly short term albedo, monthly precipitation, mean number of storm events per month, mean duration of rainfall, and mean length of rainy season. The climate data is used to estimate evapotranspiration and infiltration rates.

Soil Properties

The model is constructed with two layers (0 to 2 feet below ground surface and 2 to 24 feet below ground surface) of uniform property based upon the published and site-specific values for silty sand (boring logs from the site indicate that the subsurface soil type is predominately silty sand). The properties are summarized in the table below.

Physical Properties			
Silty Sand			
Property	value	units	source
Bulk density	1.6	g/cm^3	SESOIL soils database
Intrinsic Permeability	1.00E-9	cm^2	Based upon proximal single well hydraulic tests
disconnectedness index	5.5		SESOIL soils database
effective porosity	0.30		SESOIL soils database
organic carbon content	0.5	%	Default value Chapter 250 PA administrative code
Freundlich eqn. exponent	1		SESOIL soils database

Chemical Properties

Chemical parameters were used in SESOIL to estimate the migration and partitioning of the contaminants in the soil matrix. The contaminant of concern at AST 880 is benzene. Chemical properties for the considered contaminant were obtained from the Pennsylvania administrative code default values (where available) and published sources. A summary of the contaminant input data is provided below.

Benzene			
			source
Solubility	mg/L	1780.5	Chapter 250 PA administrative code Appendix A -Table 5
Diffusion Coefficient in air	cm^2/sec	0.077	SESOIL common chemicals file
Henry's Constant	m^3-atm/mole	0.00555	SESOIL common chemicals file
Adsorption Coefficient (koc)	ug/g-OC/ug/ml	58	Chapter 250 PA administrative code Appendix A -Table 5
molecular weight	g/mole	78.11	SESOIL common chemicals file
Biodegradation rate (k)	1/yr	0.35	Chapter 250 PA administrative code Appendix A -Table 5

Results

The maximum residual contaminant limit for benzene in soil (0-2 feet) in the area of AST 880 is 226,000 ug/kg.

Limitations

The model is a simplified version of the field problem, heterogeneities encountered in the field may have a substantial effect on the actual transport of contaminants subsurface. Variability of parameters including biodegradation rates, intrinsic permeability, organic content, hydraulic gradient, hydraulic conductivity, porosity, and recharge events will likely influence the predicted results.

Conclusions

21 soil samples were collected in order to verify that remedial activities in the area of AST 880 and AST 881 were successful. Four soil samples had Nonresidential, Used Aquifer, Soil-to-Groundwater MSC exceedences for benzene (880-8, 880-9, 880-11 and 880-13). One soil sample (881-5) exceeded the Nonresidential, Used Aquifer, Soil-to-Groundwater MSC for naphthalene.

A vadose zone model was utilized to evaluate the potential for benzene to reach the groundwater at concentrations exceeding the applicable PADEP MSC in the area of AST 880. The maximum residual contaminant limit for benzene in soil in the area of AST 880 is 226,000 ug/kg. Soil sample 881-5 was analyzed for SPLP naphthalene. 881-5 did not exceed the Nonresidential, Used Aquifer MSC for naphthalene in groundwater

While groundwater protection MSCs were exceeded for benzene and naphthalene in soil, vadose zone modeling and SPLP analysis indicate that the soil exceedences will not impact groundwater above PADEP MSCs. Since Sunoco is not seeking a release of liability and the release was contained within the AST-880 and AST-881 dike areas, Sunoco has indicated that subsurface impacts in the vicinity of AST 880 and AST 881 will be managed through other facility-wide programs. The Point Breeze Process Area is an area of Interest (AOI) identified in the Consent Order between PADEP and Sunoco for the Philadelphia Refinery.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

Sincerely,
SECOR International Incorporated

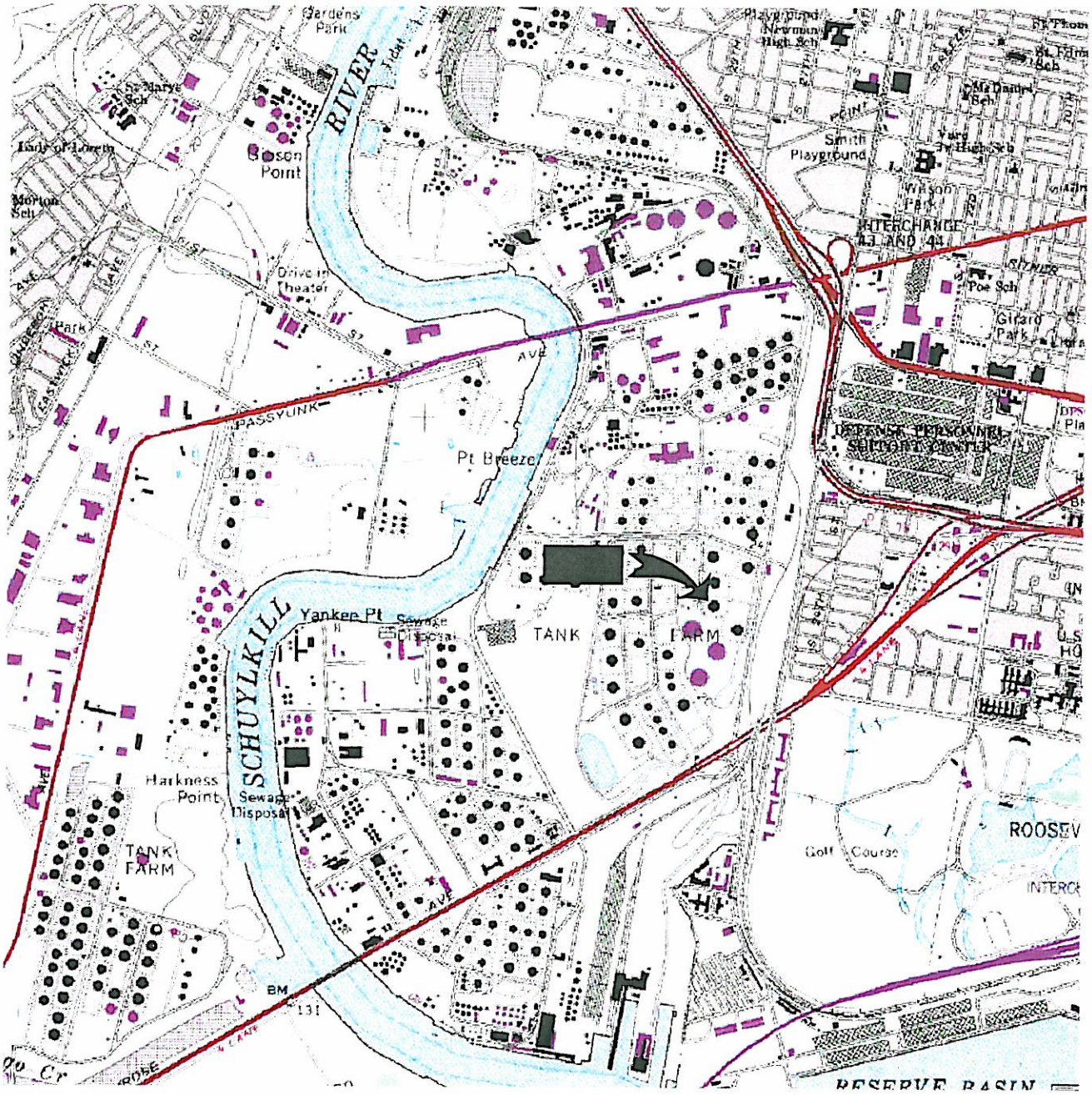
Sergio Morescalchi, P.G.
Project Geologist

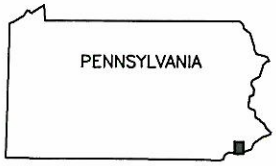
Steve Baggett, P.G.
Principal Hydrogeologist

c: James Oppenheim (Sunoco)
Project File

P:\Clients\Sunoco\AST Investigations\AST 880\AST 880 SAR.doc

FIGURES





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:
SUNOCO PHILADELPHIA REFINERY
26TH STREET AREA
PHILADELPHIA, PENNSYLVANIA

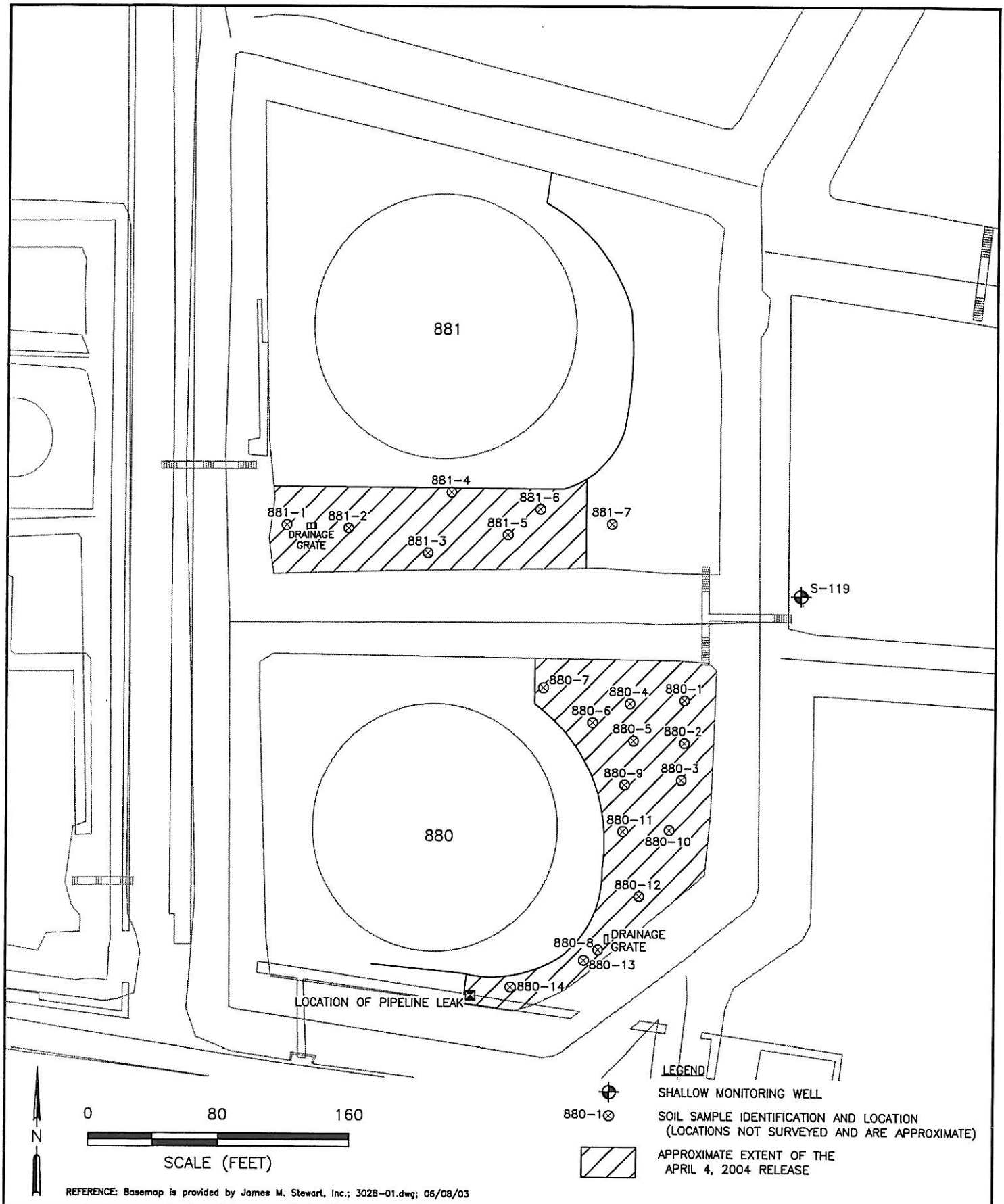
SITE LOCATION MAP
AST 880/881 AREA

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01019.02.0006	KEF			09/28/2004

P:/Clients/Sunoco/AST Investigations/AST 880/Cadd

62SU-1019-2-AST880-SL.DWG



REFERENCE: Basemap is provided by James M. Stewart, Inc.; 3028-01.dwg; 06/08/03

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR:
SUNOCO PHILADELPHIA REFINERY
26TH STREET AREA
PHILADELPHIA, PENNSYLVANIA

SUNOCO PHILADELPHIA REFINERY
AST 880/881 AREA
SOIL SAMPLE LOCATIONS

FIGURE: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01019.02.0006	KEF			09/28/2004

FILEPATH: P:/Clients/Sunoco/AST Inventigations/AST 880/Cadd

62SU-1019-2-AST880-SSLA04.DWG

TABLES

TABLE 1
Summary of Soil Analytical Results

AST 880 Area
Sunoco Philadelphia Refinery

Sample Identification	880-1	880-2	880-3	880-4	MSCs		
Sample Collection Date	4/8/2004	4/8/2004	4/8/2004	4/8/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	420	ND(12)	ND(13)	140	210,000	240,000	500
Toluene	2,700	ND(23)	ND(27)	1,300	10,000,000	10,000,000	100,000
Ethylbenzene	1,000	ND(23)	ND(27)	660	10,000,000	10,000,000	70,000
Isopropylbenzene	350	ND(23)	ND(27)	270	10,000,000	10,000,000	1,600,000
Naphthalene	2,000	ND(23)	ND(27)	1,100	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	ND(190)	ND(39)	ND(410)	ND(200)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND(190)	ND(39)	ND(410)	ND(200)	110,000	190,000,000	320,000
Benzo(a)pyrene	ND(190)	ND(39)	ND(410)	ND(200)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND(190)	ND(39)	ND(410)	ND(200)	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND(190)	ND(39)	ND(410)	ND(200)	170,000,000	190,000,000	180,000
Chrysene	ND(190)	ND(39)	ND(410)	ND(200)	11,000,000	190,000,000	230,000
Fluorene	460 J	ND(39)	ND(410)	340 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	ND(190)	ND(39)	ND(410)	ND(200)	110,000	190,000,000	28,000,000
Phenanthrene	860 J	ND(39)	ND(410)	590 J	190,000,000	190,000,000	10,000,000
Pyrene	200 J	ND(39)	ND(410)	ND(200)	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (400) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 1
Summary of Soil Analytical Results

AST 880 Area
Sunoco Philadelphia Refinery

Sample Identification	880-5	880-6	880-7	880-8	MSCs		
Sample Collection Date	4/8/2004	4/8/2004	4/8/2004	4/8/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	220	ND(12)	18 J	**580**	210,000	240,000	500
Toluene	2,400	34 J	30 J	3,200	10,000,000	10,000,000	100,000
Ethylbenzene	1,300	ND(25)	ND(24)	1,200	10,000,000	10,000,000	70,000
Isopropylbenzene	490	ND(25)	ND(24)	390	10,000,000	10,000,000	1,600,000
Naphthalene	2,100	ND(25)	38 J	1,400	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	220 J	ND(40)	ND(390)	740 J	190,000,000	190,000,000	350,000
Benzo(a)anthracene	160 J	ND(40)	ND(390)	520 J	110,000	190,000,000	320,000
Benzo(a)pyrene	170 J	ND(40)	ND(390)	590 J	11,000	190,000,000	46,000
Benzo(b)fluoranthene	200 J	ND(40)	ND(390)	680 J	110,000	190,000,000	170,000
Benzo(ghi)perylene	100 J	ND(40)	ND(390)	ND(440)	170,000,000	190,000,000	180,000
Chrysene	200 J	ND(40)	ND(390)	1,000 J	11,000,000	190,000,000	230,000
Fluorene	570	ND(40)	ND(390)	1,900 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	100 J	ND(40)	ND(390)	ND(440)	110,000	190,000,000	28,000,000
Phenanthrene	1,200	ND(40)	ND(390)	4,100 J	190,000,000	190,000,000	10,000,000
Pyrene	360 J	ND(40)	ND(390)	1,300 J	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (400) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 1
Summary of Soil Analytical Results

AST 880 Area
Sunoco Philadelphia Refinery

Sample Identification	880-9	880-10	880-11	880-12	MSCs		
Sample Collection Date	4/21/2004	4/21/2004	4/21/2004	4/21/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	**3,100**	330	**1,100**	34 J	210,000	240,000	500
Toluene	29,000	1,700	12,000	260 J	10,000,000	10,000,000	100,000
Ethylbenzene	13,000	720	6,300	150 J	10,000,000	10,000,000	70,000
Isopropylbenzene	4,600	300	2,700	69 J	10,000,000	10,000,000	1,600,000
Naphthalene	22,000	1,300	13,000	410	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	170,000,000	190,000,000	180,000
Chrysene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	11,000,000	190,000,000	230,000
Fluorene	ND (2,000)	1400 J	2800 J	ND (2,000)	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	110,000	190,000,000	28,000,000
Phenanthrene	4100 J	3300 J	5900 J	ND (2,000)	190,000,000	190,000,000	10,000,000
Pyrene	ND (2,000)	ND (1,000)	ND (2,000)	ND (2,000)	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (400) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 1
Summary of Soil Analytical Results

AST 880 Area
Sunoco Philadelphia Refinery

Sample Identification	880-13	880-14	MSCs		
Sample Collection Date	4/21/2004	9/7/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs					
Benzene	**8,000**	14	210,000	240,000	500
Toluene	24,000	37	10,000,000	10,000,000	100,000
Ethylbenzene	3,300	ND (24)	10,000,000	10,000,000	70,000
Isopropylbenzene	1,600	31	10,000,000	10,000,000	1,600,000
Naphthalene	10,000	220	56,000,000	190,000,000	25,000
SVOCs					
Anthracene	ND (2,000)	21 J	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (2,000)	63	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (2,000)	99	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (2,000)	85	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (2,000)	100	170,000,000	190,000,000	180,000
Chrysene	ND (2,000)	85	11,000,000	190,000,000	230,000
Fluorene	ND (2,000)	26 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	ND (2,000)	ND (20)	110,000	190,000,000	28,000,000
Phenanthrene	2000 J	160	190,000,000	190,000,000	10,000,000
Pyrene	ND (2,000)	190	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (400) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 2
Summary of Soil Analytical Results

AST 881 Area
Sunoco Philadelphia Refinery

Sample Identification	881-1	881-2	881-3	881-4	MSCs		
Sample Collection Date	7/22/2004	7/22/2004	7/22/2004	7/22/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs							
Benzene	ND (1.2)	11	ND (20)	ND (1.1)	210,000	240,000	500
Toluene	2.4 J	32	250	2.7 J	10,000,000	10,000,000	100,000
Ethylbenzene	ND (1.2)	23	300	ND (1.1)	10,000,000	10,000,000	70,000
Isopropylbenzene	ND (3.1)	84	850	ND (2.8)	10,000,000	10,000,000	1,600,000
Naphthalene	ND (6.1)	ND (1,200)	3,400	13	56,000,000	190,000,000	25,000
SVOCs							
Anthracene	19	57	170 J	ND (35)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	77	18 J	ND (73)	78 J	110,000	190,000,000	320,000
Benzo(a)pyrene	91	21 J	ND (110)	ND (120)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	67	19 J	ND (150)	ND (150)	110,000	190,000,000	170,000
Benzo(ghi)perylene	120	ND (16)	ND (150)	ND (150)	170,000,000	190,000,000	180,000
Chrysene	75	65 J	ND (740)	ND (120)	11,000,000	190,000,000	230,000
Fluorene	5.7 J	69 J	240 J	ND (230)	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	43	ND (20)	ND (180)	ND (190)	110,000	190,000,000	28,000,000
Phenanthrene	96	250	610 J	ND (120)	190,000,000	190,000,000	10,000,000
Pyrene	210	120 J	390 J	ND (270)	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/kg (micrograms per kilogram)

ND (400) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)

(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 2
Summary of Soil Analytical Results

AST 881 Area
Sunoco Philadelphia Refinery

Sample Identification	881-5	881-6	881-7	MSCs		
Sample Collection Date	7/22/2004	7/22/2004	7/22/2004	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs						
Benzene	ND (180)	ND (320)	ND (200)	210,000	240,000	500
Toluene	1,700	ND (320)	330 J	10,000,000	10,000,000	100,000
Ethylbenzene	ND (180)	ND (320)	ND (500)	10,000,000	10,000,000	70,000
Isopropylbenzene	5,800	ND (810)	2,900	10,000,000	10,000,000	1,600,000
Naphthalene	**31,000**	20,000	18,000	56,000,000	190,000,000	25,000
SVOCs						
Anthracene	890	360 J	240 J	190,000,000	190,000,000	350,000
Benzo(a)anthracene	ND (140)	ND (140)	ND (69)	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (220)	ND (210)	ND (100)	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (290)	ND (290)	ND (140)	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (290)	ND (290)	ND (140)	170,000,000	190,000,000	180,000
Chrysene	ND (220)	ND (210)	ND (100)	11,000,000	190,000,000	230,000
Fluorene	1,800 J	ND (430)	490 J	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	ND (360)	ND (360)	ND (170)	110,000	190,000,000	28,000,000
Phenanthrene	4,200	660 J	1,100	190,000,000	190,000,000	10,000,000
Pyrene	1,600 J	920 J	540 J	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.
All results in ug/kg (micrograms per kilogram)
ND (400) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)
BOLD = Exceeds PADEP Medium-Specific Concentration

TABLE 3
Summary of SPLP Analytical Results

AST 881 Area
Sunoco Philadelphia Refinery

Sample Identification	881-1	881-2	881-3	881-4	881-5	881-6	881-7	MSCs
Sample Collection Date	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	Used Aquifers, Non-residential area (1)
VOCs								
Naphthalene	3.5 J	1.7 J	ND (1.6)	ND (1.6)	39	ND (2.3)	16	100
SVOCs								
Anthracene	0.47	0.31	0.2	ND (0.039)	0.31	0.19 J	0.43	66
Benzo(a)anthracene	0.031 J	ND (0.019)	ND (0.2)	ND (0.019)	ND (0.025)	ND (0.028)	0.024 J	3.6
Benzo(a)pyrene	ND (0.02)	ND (0.019)	ND (0.02)	ND (0.019)	ND (0.025)	ND (0.028)	ND (0.02)	0.2
Benzo(b)fluoranthene	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.051)	ND (0.056)	ND (0.039)	1.2
Benzo(ghi)perylene	ND (0.098)	ND (0.096)	ND (0.098)	ND (0.097)	ND (0.13)	ND (0.14)	ND (0.098)	0.26
Chrysene	ND (0.078)	ND (0.077)	ND (0.078)	ND (0.078)	ND (0.1)	ND (0.11)	ND (0.079)	1.9
Fluorene	0.55 J	0.78	0.89	ND (0.17)	2.60	0.84 J	2.3	1,900
Indeno(1,2,3-cd)pyrene	ND (0.078)	ND (0.077)	ND (0.078)	ND (0.078)	ND (0.1)	ND (0.11)	ND (0.079)	3.6
Phenanthrene	3.00	1.50	0.88	ND (0.078)	2.7	0.73	3.2	1,100
Pyrene	0.68 J	0.18 J	0.18 J	ND (0.17)	ND (0.23)	ND (0.25)	0.36 J	130

NOTES:

All soil samples collected at approximately 6" below grade.

All results in ug/l (micrograms per liter)

ND (0.02) = Not detected at or above the laboratory reporting limit

J = Estimated value

MSCs = Medium-Specific Concentrations

(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 1 (Revised November 24, 2001)

P:\Clients\Sunoco\AST Investigations\AST 880\[ast 881 splp results.xls]881

APPENDIX A

Laboratory Analytical Report

April 8, 2004 Soil Analytical Results
April 21, 2004 Soil Analytical Results
July 22, 2004 Soil Analytical Results
September 7, 2004 Soil Analytical Results

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 891702. Samples arrived at the laboratory on Friday, April 09, 2004. The PO# for this group is PHILA REFINERY.

Client Description	Lancaster Labs Number
880-1 Grab Soil Sample	4252250
880-2 Grab Soil Sample	4252251
880-3 Grab Soil Sample	4252252
880-4 Grab Soil Sample	4252253
880-5 Grab Soil Sample	4252254
880-6 Grab Soil Sample	4252255
880-7 Grab Soil Sample	4252256
880-8 Grab Soil Sample	4252257
Trip Blank Methanol Sample	4252258

1 COPY TO Secor International, Inc. Attn: Serigo Morescalchi

Lancaster Laboratories

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Michele M. Turner

Michele M. Turner
Manager

MEMBER ACIL

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

RECEIVED
APR 22 2004
By

Lancaster Laboratories Sample No. SW 4252250

880-1 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:00 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:37
Discard: 05/16/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

-8801

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	14.2		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	200.	J	190.	ug/kg	1
03768	Fluorene	86-73-7	460.	J	190.	ug/kg	1
03775	Phenanthrene	85-01-8	860.	J	190.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		190.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		190.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		190.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		190.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		190.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		190.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		190.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	420.		10.	ug/kg	17.28
05466	Toluene	108-88-3	2,700.		20.	ug/kg	17.28
05474	Ethylbenzene	100-41-4	1,000.		20.	ug/kg	17.28
05479	Isopropylbenzene	98-82-8	350.		20.	ug/kg	17.28
05498	Naphthalene	91-20-3	2,000.		20.	ug/kg	17.28
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/12/2004 13:10	Cheryl L Robinson	1

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Lancaster Laboratories Sample No. SW 4252250

880-1 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:00 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:37
Discard: 05/16/2004

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-8801

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 07:51	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 11:22	Kenneth L Boley Jr	17.28
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:00	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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Lancaster Laboratories Sample No. SW 4252251

880-2 Grab Soil Sample
Sunoco Philadelphia Refinery

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Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:37
Discard: 05/16/2004

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-8802

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	14.5	1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	39.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	39.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	39.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	39.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	39.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	39.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	39.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	39.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	39.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	39.	ug/kg	1
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	12.	ug/kg	20
05466	Toluene	108-88-3	N.D.	23.	ug/kg	20
05474	Ethylbenzene	100-41-4	N.D.	23.	ug/kg	20
05479	Isopropylbenzene	98-82-8	N.D.	23.	ug/kg	20
05498	Naphthalene	91-20-3	N.D.	23.	ug/kg	20
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.					

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/12/2004 13:36	Cheryl L Robinson	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 10:08	Mark A Clark	1

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Lancaster Laboratories Sample No. SW 4252251

880-2 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:15 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
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Discard: 05/16/2004

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-8802

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 11:49	Kenneth L Boley Jr	20
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:01	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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880-3 Grab Soil Sample
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Discard: 05/16/2004

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-8803

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	18.1	1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	410.	ug/kg	1
03768	Fluorene	86-73-7	N.D.	410.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.	410.	ug/kg	1
03776	Anthracene	120-12-7	N.D.	410.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.	410.	ug/kg	1
03782	Chrysene	218-01-9	N.D.	410.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.	410.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.	410.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	410.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	410.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.					
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	13.	ug/kg	21.95
05466	Toluene	108-88-3	N.D.	27.	ug/kg	21.95
05474	Ethylbenzene	100-41-4	N.D.	27.	ug/kg	21.95
05479	Isopropylbenzene	98-82-8	N.D.	27.	ug/kg	21.95
05498	Naphthalene	91-20-3	N.D.	27.	ug/kg	21.95
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.					

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/12/2004 13:45	Cheryl L Robinson	1

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880-3 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:25 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8803

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 10:54	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 12:16	Kenneth L Boley Jr	21.95
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:02	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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880-4 Grab Soil Sample
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-8804

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	15.2		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		200.	ug/kg	1
03768	Fluorene	86-73-7	340.	J	200.	ug/kg	1
03775	Phenanthrene	85-01-8	590.	J	200.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		200.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		200.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		200.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		200.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		200.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		200.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		200.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	140.		13.	ug/kg	21.48
05466	Toluene	108-88-3	1,300.		25.	ug/kg	21.48
05474	Ethylbenzene	100-41-4	660.		25.	ug/kg	21.48
05479	Isopropylbenzene	98-82-8	270.		25.	ug/kg	21.48
05498	Naphthalene	91-20-3	1,100.		25.	ug/kg	21.48
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/12/2004 13:55	Cheryl L Robinson	1

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880-4 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:30 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
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-8804

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 11:40	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 12:43	Kenneth L Boley Jr	21.48
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:03	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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880-5 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:40 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8805

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	16.4		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	360.	J	40.	ug/kg	1
03768	Fluorene	86-73-7	570.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	1,200.		40.	ug/kg	1
03776	Anthracene	120-12-7	220.	J	40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	160.	J	40.	ug/kg	1
03782	Chrysene	218-01-9	200.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	200.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	170.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	100.	J	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	100.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	220.		13.	ug/kg	22.52
05466	Toluene	108-88-3	2,400.		27.	ug/kg	22.52
05474	Ethylbenzene	100-41-4	1,300.		27.	ug/kg	22.52
05479	Isopropylbenzene	98-82-8	490.		27.	ug/kg	22.52
05498	Naphthalene	91-20-3	2,100.		27.	ug/kg	22.52
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/12/2004 14:11	Cheryl L Robinson	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 12:25	Mark A Clark	1

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Lancaster Laboratories Sample No. SW 4252254

880-5 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:40 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8805

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 13:10	Kenneth L Boley Jr	22.52
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:04	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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Lancaster Laboratories Sample No. SW 4252255

880-6 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:50 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8806

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	15.7		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		40.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		12.	ug/kg	20.76
05466	Toluene	108-88-3	34.	J	25.	ug/kg	20.76
05474	Ethylbenzene	100-41-4	N.D.		25.	ug/kg	20.76
05479	Isopropylbenzene	98-82-8	N.D.		25.	ug/kg	20.76
05498	Naphthalene	91-20-3	N.D.		25.	ug/kg	20.76
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/13/2004 06:51	Cheryl L Robinson	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 13:11	Mark A Clark	1

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Lancaster Laboratories Sample No. SW 4252255

880-6 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 15:50 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8806

02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 13:37	Kenneth L Boley Jr	20.76
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:05	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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Lancaster Laboratories Sample No. SW 4252256

880-7 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:00 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8807

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	15.1		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		390.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		390.	ug/kg	1
03775	Phenanthrene	85-01-8	N.D.		390.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		390.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		390.	ug/kg	1
03782	Chrysene	218-01-9	N.D.		390.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	N.D.		390.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		390.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		390.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		390.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	18.	J	12.	ug/kg	20.16
05466	Toluene	108-88-3	30.	J	24.	ug/kg	20.16
05474	Ethylbenzene	100-41-4	N.D.		24.	ug/kg	20.16
05479	Isopropylbenzene	98-82-8	N.D.		24.	ug/kg	20.16
05498	Naphthalene	91-20-3	38.	J	24.	ug/kg	20.16
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/13/2004 07:54	Cheryl L Robinson	1

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Lancaster Laboratories Sample No. SW 4252256

880-7 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:00 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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Exton PA 19341

-8807

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 13:57	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 14:04	Kenneth L Boley Jr	20.16
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:06	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

Lancaster Laboratories

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Lancaster Laboratories Sample No. SW 4252257

880-8 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:10 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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Exton PA 19341

-8808

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	25.0		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	1,300.	J	440.	ug/kg	1
03768	Fluorene	86-73-7	1,900.	J	440.	ug/kg	1
03775	Phenanthrene	85-01-8	4,100.	J	440.	ug/kg	1
03776	Anthracene	120-12-7	740.	J	440.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	520.	J	440.	ug/kg	1
03782	Chrysene	218-01-9	1,000.	J	440.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	680.	J	440.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	590.	J	440.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		440.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		440.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	580.		15.	ug/kg	22.67
05466	Toluene	108-88-3	3,200.		30.	ug/kg	22.67
05474	Ethylbenzene	100-41-4	1,200.		30.	ug/kg	22.67
05479	Isopropylbenzene	98-82-8	390.		30.	ug/kg	22.67
05498	Naphthalene	91-20-3	1,400.		30.	ug/kg	22.67
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/13/2004 08:04	Cheryl L Robinson	1

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Lancaster Laboratories Sample No. SW 4252257

880-8 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:10 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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-8808

07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 14:43	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 14:30	Kenneth L Boley Jr	22.67
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:07	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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Lancaster Laboratories Sample No. G5 4252258

Trip Blank Methanol Sample
Sunoco Philadelphia Refinery

Collected: n.a.

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

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Suite 200
Exton PA 19341

-88TB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	25.	ug/kg	50
05466	Toluene	108-88-3	N.D.	50.	ug/kg	50
05474	Ethylbenzene	100-41-4	N.D.	50.	ug/kg	50
05479	Isopropylbenzene	98-82-8	N.D.	50.	ug/kg	50
05498	Naphthalene	91-20-3	N.D.	50.	ug/kg	50

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/13/2004 14:57	Kenneth L Boley Jr	50
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:08	Lisa J Cooke	1

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Lancaster Laboratories Sample No. SW 4252259

880-Surface Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:30 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

Secor International, Inc.
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-880S

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
02111	Moisture	n.a.	8.3		1.0	%	1
	"Moisture" represents the loss in weight of the sample after drying with an infrared lamp at 150 degrees Celsius.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	3,100.	J	360.	ug/kg	1
03768	Fluorene	86-73-7	12,000.		360.	ug/kg	1
03775	Phenanthrene	85-01-8	28,000.		360.	ug/kg	1
03776	Anthracene	120-12-7	3,600.	J	360.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	N.D.		360.	ug/kg	1
03782	Chrysene	218-01-9	2,100.	J	360.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	880.	J	360.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	N.D.		360.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		360.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		360.	ug/kg	1
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	36,000.		260.	ug/kg	472.59
05466	Toluene	108-88-3	140,000.		520.	ug/kg	472.59
05474	Ethylbenzene	100-41-4	41,000.		520.	ug/kg	472.59
05479	Isopropylbenzene	98-82-8	13,000.		520.	ug/kg	472.59
05498	Naphthalene	91-20-3	52,000.		520.	ug/kg	472.59
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Surrogate recoveries were outside of QC limits for the GC/MS volatile fraction due to the dilution needed to perform the analysis.

Commonwealth of Pennsylvania Lab Certification No. 36-037

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Lancaster Laboratories Sample No. SW 4252259

880-Surface Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/08/2004 16:30 by SM

Account Number: 11183

Submitted: 04/09/2004 16:45
Reported: 04/15/2004 at 16:38
Discard: 05/16/2004

Secor International, Inc.
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-880S

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02111	Moisture	EPA 160.3 modified	1	04/13/2004 08:17	Cheryl L Robinson	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/12/2004 15:29	Mark A Clark	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/14/2004 00:53	Marla S Lord	472.59
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/12/2004 19:09	Lisa J Cooke	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/10/2004 17:30	Mark P Mastropietro	1

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Quality Control Summary

Client Name: Secor International, Inc.
Reported: 04/15/04 at 04:38 PM

Group Number: 891702

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 04101SLB026	Sample number(s): 4252250-4252257,4252259							
Pyrene	N.D.	33.	ug/kg	95		71-110		
Fluorene	N.D.	33.	ug/kg	89		66-115		
Phenanthrene	N.D.	33.	ug/kg	92		70-107		
Anthracene	N.D.	33.	ug/kg	84		71-107		
Benzo(a)anthracene	N.D.	33.	ug/kg	91		74-107		
Chrysene	N.D.	33.	ug/kg	84		72-109		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	98		71-113		
Benzo(a)pyrene	N.D.	33.	ug/kg	96		79-113		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	93		74-113		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	94		74-119		
Batch number: 04103471201A	Sample number(s): 4252250-4252254							
Moisture				101		99-103		
Batch number: 04104471201A	Sample number(s): 4252255-4252257,4252259							
Moisture				101		99-103		
Batch number: Q041041AA	Sample number(s): 4252250-4252258							
Benzene	N.D.	25.	ug/kg	100	100	83-118	0	30
Toluene	N.D.	50.	ug/kg	96	97	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	96	97	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	94	94	79-117	0	30
Naphthalene	N.D.	50.	ug/kg	89	89	59-123	0	30
Batch number: Q041041AB	Sample number(s): 4252259							
Benzene	N.D.	25.	ug/kg	100	100	83-118	0	30
Toluene	N.D.	50.	ug/kg	96	97	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	96	97	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	94	94	79-117	0	30
Naphthalene	N.D.	50.	ug/kg	89	89	59-123	0	30

Sample Matrix Quality Control

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.

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Quality Control Summary

Client Name: Secor International, Inc. Group Number: 891702
Reported: 04/15/04 at 04:38 PM

Analysis Name	%REC	%REC	Limits	RPD	MAX	Conc	Conc	RPD	Max
Batch number: 04101SLB026	Sample number(s): 4252250-4252257,4252259								
Pyrene	88	86	28-144	2	30				
Fluorene	79	72	39-137	8	30				
Phenanthrene	84	76	29-143	8	30				
Anthracene	92	88	35-138	4	30				
Benzo(a)anthracene	89	81	26-144	9	30				
Chrysene	91	90	23-150	1	30				
Benzo(b)fluoranthene	91	83	32-140	9	30				
Benzo(a)pyrene	96	88	23-154	9	30				
Indeno(1,2,3-cd)pyrene	96	91	36-141	5	30				
Benzo(g,h,i)perylene	96	88	17-152	9	30				
Batch number: 04103471201A	Sample number(s): 4252250-4252254								
Moisture						14.2	18.5	27*	7
Batch number: 04104471201A	Sample number(s): 4252255-4252257,4252259								
Moisture						15.7	18.9	19*	7

Surrogate Quality Control

Analysis Name: PAHs in Soil by GC/MS
Batch number: 04101SLB026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4252250	106	99	104
4252251	73	83	101
4252252	97	113	117
4252253	88	97	99
4252254	72	79	88
4252255	80	93	98
4252256	84	107	101
4252257	86	97	93
4252259	117	90	102
Blank	72	85	95
LCS	81	94	98
MS	96	98	94
MSD	85	84	95
Limits:	47-128	55-123	49-133

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q041041AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4252250	91	99	90	97
4252251	100	102	95	94

*- 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.

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Quality Control Summary

Client Name: Secor International, Inc. Group Number: 891702
Reported: 04/15/04 at 04:38 PM

Surrogate Quality Control

4252252	107	112	101	100
4252253	82	87	88	87
4252254	89	95	100	101
4252255	83	90	80	81
4252256	101	107	95	96
4252257	89	95	91	90
4252258	93	99	89	87
Blank	96	99	90	86
LCS	99	102	97	96
LCSD	100	104	97	96
Limits:	70-129	70-121	70-130	70-128

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q041041AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4252259	85	88	294*	215*
Blank	95	100	91	89
LCS	99	102	97	96
LCSD	100	104	97	96
Limits:	70-129	70-121	70-130	70-128

*- 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.

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ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 893279. Samples arrived at the laboratory on Thursday, April 22, 2004. The PO# for this group is PHILA. REFINERY.

Client Description	Lancaster Labs Number
880-9 Grab Soil Sample	4259682
880-10 Grab Soil Sample	4259683
880-11 Grab Soil Sample	4259684
880-12 Grab Soil Sample	4259685
880-13 Grab Soil Sample	4259686
Trip Blank Methanol Sample	4259687

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Robin C Runkle

ROBIN C. RUNKLE
SENIOR CHEMIST

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259682

880-9 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:20 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:37
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
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Exton PA 19341

-8809

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.1		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	N.D.		2,000.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		2,000.	ug/kg	5
03775	Phenanthrene	85-01-8	4,100.	J	2,000.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		2,000.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		2,000.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		2,000.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		2,000.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		2,000.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	.193-39-5	N.D.		2,000.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		2,000.	ug/kg	5
	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.						
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
	The recovery of indeno(1,2,3-cd)pyrene was above QC limits in the LCS. Since this compound was not detected in the sample, no further action was taken.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	3,100.		26.	ug/kg	43.18
05466	Toluene	108-88-3	29,000.		260.	ug/kg	215.89
05474	Ethylbenzene	100-41-4	13,000.		51.	ug/kg	43.18
05479	Isopropylbenzene	98-82-8	4,600.		51.	ug/kg	43.18
05498	Naphthalene	91-20-3	22,000.		260.	ug/kg	215.89
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

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Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259682

880-9 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:20 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:37
Discard: 05/18/2004

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-8809

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	04/23/2004 13:46	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/24/2004 17:18	Brian K Graham	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/27/2004 01:42	Parker D Lindstrom	43.18
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/27/2004 07:40	Parker D Lindstrom	215.89
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:15	Sherri A Yohn	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/23/2004 17:50	Mark P Mastropietro	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259683

880-10 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:40 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:37
Discard: 05/18/2004

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102 Pickering Way
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Exton PA 19341

88010

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	18.0		0.50	%	1

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

07804 PAHs in Soil by GC/MS

01195	Pyrene	129-00-0	N.D.		1,000.	ug/kg	5
03768	Fluorene	86-73-7	1,400.	J	1,000.	ug/kg	5
03775	Phenanthrene	85-01-8	3,300.	J	1,000.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		1,000.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		1,000.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		1,000.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		1,000.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		1,000.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		1,000.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		1,000.	ug/kg	5

Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

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.

Surrogate recoveries were outside of QC limits for the GC/MS semivolatile compounds due to the dilution needed to perform the analysis.

The recovery of indeno(1,2,3-cd)pyrene was above QC limits in the LCS. Since this compound was not detected in the sample, no further action was taken.

02304 UST-Unleaded Soils by 8260B

05460	Benzene	71-43-2	330.		28.	ug/kg	45.96
05466	Toluene	108-88-3	1,700.		56.	ug/kg	45.96
05474	Ethylbenzene	100-41-4	720.		56.	ug/kg	45.96
05479	Isopropylbenzene	98-82-8	300.		56.	ug/kg	45.96
05498	Naphthalene	91-20-3	1,300.		56.	ug/kg	45.96

The analysis for volatiles was performed on a sample which was preserved

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259683

880-10 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:40 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:37
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

88010

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	04/23/2004 13:46	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/24/2004 18:15	Brian K Graham	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/26/2004 21:12	Susan McMahon-Luu	45.96
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:16	Sherri A Yohn	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/23/2004 17:50	Mark P Mastropietro	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259684

880-11 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:45 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

88011

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.2		0.50	%	1

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.

07804 PAHs in Soil by GC/MS

01195	Pyrene	129-00-0	N.D.		2,000.	ug/kg	5
03768	Fluorene	86-73-7	2,800.	J	2,000.	ug/kg	5
03775	Phenanthrene	85-01-8	5,900.	J	2,000.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		2,000.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		2,000.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		2,000.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		2,000.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		2,000.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		2,000.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		2,000.	ug/kg	5

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.

Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.

Surrogate recoveries were outside of QC limits for the GC/MS semivolatile compounds due to the dilution needed to perform the analysis.

The recovery of indeno(1,2,3-cd)pyrene was above QC limits in the LCS. Since this compound was not detected in the sample, no further action was taken.

02304 UST-Unleaded Soils by 8260B

05460	Benzene	71-43-2	1,100.		29.	ug/kg	48.08
05466	Toluene	108-88-3	12,000.		57.	ug/kg	48.08
05474	Ethylbenzene	100-41-4	6,300.		57.	ug/kg	48.08
05479	Isopropylbenzene	98-82-8	2,700.		57.	ug/kg	48.08
05498	Naphthalene	91-20-3	13,000.		57.	ug/kg	48.08

The analysis for volatiles was performed on a sample which was preserved

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259684

880-11 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:45 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

88011

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	04/23/2004 13:46	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/24/2004 19:12	Brian K Graham	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/27/2004 01:15	Parker D Lindstrom	48.08
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:17	Sherri A Yohn	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/23/2004 17:50	Mark P Mastropietro	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259685

880-12 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:50 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

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Suite 200
Exton PA 19341

88012

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		2,000.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		2,000.	ug/kg	5
03775	Phenanthrene	85-01-8	N.D.		2,000.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		2,000.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		2,000.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		2,000.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		2,000.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		2,000.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		2,000.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		2,000.	ug/kg	5
	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.						
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
	The recovery of indeno(1,2,3-cd)pyrene was above QC limits in the LCS. Since this compound was not detected in the sample, no further action was taken.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	34.	J	28.	ug/kg	45.87
05466	Toluene	108-88-3	260.	J	56.	ug/kg	45.87
05474	Ethylbenzene	100-41-4	150.	J	56.	ug/kg	45.87
05479	Isopropylbenzene	98-82-8	69.	J	56.	ug/kg	45.87
05498	Naphthalene	91-20-3	410.		56.	ug/kg	45.87
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259685

880-12 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 10:50 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

Secor International, Inc.
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88012

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	04/23/2004 13:46	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/24/2004 20:10	Brian K Graham	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/26/2004 21:39	Susan McMahon-Luu	45.87
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:18	Sherri A Yohn	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/23/2004 17:50	Mark P Mastropietro	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259686

880-13 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 11:00 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

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Suite 200
Exton PA 19341

88013

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		2,000.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		2,000.	ug/kg	5
03775	Phenanthrene	85-01-8	2,000.	J	2,000.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		2,000.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		2,000.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		2,000.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		2,000.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		2,000.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		2,000.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		2,000.	ug/kg	5
	Due to sample matrix interferences observed during the extraction, the normal reporting limits could not be obtained.						
	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.						
	The recovery of indeno(1,2,3-cd)pyrene was above QC limits in the LCS. Since this compound was not detected in the sample, no further action was taken.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	8,000.		29.	ug/kg	47.8
05466	Toluene	108-88-3	24,000.		230.	ug/kg	191.2
05474	Ethylbenzene	100-41-4	3,300.		57.	ug/kg	47.8
05479	Isopropylbenzene	98-82-8	1,600.		57.	ug/kg	47.8
05498	Naphthalene	91-20-3	10,000.		57.	ug/kg	47.8
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4259686

880-13 Grab Soil Sample
Sunoco Philadelphia Refinery

Collected:04/24/2004 11:00 by SM

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

88013

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	04/23/2004 13:46	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	04/26/2004 20:39	Jolene M Graham	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/27/2004 00:49	Parker D Lindstrom	47.8
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/27/2004 07:13	Parker D Lindstrom	191.2
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:19	Sherri A Yohn	1
07806	BNA Soil Extraction	SW-846 3550B	1	04/23/2004 17:50	Mark P Mastropietro	1

Lancaster Laboratories

Lancaster Laboratories Sample No. G5 4259687

Trip Blank Methanol Sample
Sunoco Philadelphia Refinery

Collected: n.a.

Account Number: 11183

Submitted: 04/22/2004 16:00
Reported: 05/03/2004 at 16:38
Discard: 05/18/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

TB880

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	N.D.	25.	ug/kg	50
05466	Toluene	108-88-3	N.D.	50.	ug/kg	50
05474	Ethylbenzene	100-41-4	N.D.	50.	ug/kg	50
05479	Isopropylbenzene	98-82-8	N.D.	50.	ug/kg	50
05498	Naphthalene	91-20-3	N.D.	50.	ug/kg	50

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	04/26/2004 19:25	Susan McMahon-Luu	50
06171	HL MeOH VOA Prep Dept 21	SW-846 5035	1	04/23/2004 02:20	Sherri A Yohn	1

Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
Where quality is a science.

For Lancaster Laboratories use only

Acct. # 11183 Group# 893279 Sample # 4259682-87 **COC #** 0050812

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: SECOR Acct. #:
Project Name/#: SUNOCO - PHIL. REFINERY TANK 880 PWSID #:
Project Manager: SERGIO MORESCALCHI P.O.#:
Sampler: S.M. Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 1189127

(2) (3) (4) (5) (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water	Other	Total # of Containers	5035/8260B & 8270C	PADEP SHORT LISTS	FUEL OIL NO. 4, 5, 6 & USED MOTOR OIL	CNO LEAD						Remarks
880-9	04-21-04	1020	✓		✓			2	✓									
880-10	↓	1040	✓		✓			2	✓									
880-11		1045	✓		✓			2	✓									
880-12		1050	✓		✓			2	✓									
880-13		1100	✓		✓			2	✓									
TRIP BLANK							✓	1	✓									

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: 04-28-04
Rush results requested by (please circle): Phone Fax or E-mail
Phone #: Fax #: 484-875-9286
E-mail address: SMORESCALCHI@SECOR.COM

(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
[signature]	4/12/04	15:30	L J Wolf	4/13/04	0800
L J Wolf	4/13/04	0800			
[signature]	04-22-04	0915	[signature]	4-22-04	0915
[signature]	4-22-04	1600			
			Jessica Barr	4-22-04	1600

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

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Analysis Report

REPRINT

ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 904975. Samples arrived at the laboratory on Friday, July 23, 2004. The PO# for this group is 881.

Client Description	Lancaster Labs Number
881-1 Grab Soil Sample	4316677
881-2 Grab Soil Sample	4316678
881-3 Grab Soil Sample	4316679
881-4 Grab Soil Sample	4316680
881-5 Grab Soil Sample	4316681
881-6 Grab Soil Sample	4316682
881-7 Grab Soil Sample	4316683
Trip Blank Methanol Sample	4316684

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Lancaster Laboratories

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Analysis Report

REPRINT

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Charles J. Neslund
Group Leader

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4316677

881-1 Grab Soil Sample
SUN: 881

Collected:07/22/2004 10:50 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

881-1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.1		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.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		1.2	ug/kg	13
08184	Toluene	108-88-3	2.4	J	1.2	ug/kg	13
08185	Ethylbenzene	100-41-4	N.D.		1.2	ug/kg	13
08188	Isopropylbenzene	98-82-8	N.D.		3.1	ug/kg	13
08189	Naphthalene	91-20-3	N.D.		6.1	ug/kg	13
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	5.7	J	4.7	ug/kg	1
01007	Phenanthrene	85-01-8	96.		0.035	ug/kg	1
01008	Anthracene	120-12-7	19.		0.011	ug/kg	1
01012	Pyrene	129-00-0	210.		5.5	ug/kg	1
01014	Benzo(a)anthracene	56-55-3	77.		1.6	ug/kg	1
01016	Chrysene	218-01-9	75.		2.4	ug/kg	1
01017	Benzo(b)fluoranthene	205-99-2	67.		3.1	ug/kg	1
01019	Benzo(a)pyrene	50-32-8	91.		2.4	ug/kg	1
01025	Indeno(1,2,3-cd)pyrene	193-39-5	43.		3.9	ug/kg	1
01026	Benzo(g,h,i)perylene	191-24-2	120.		3.1	ug/kg	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 09:41	Stephanie A Selis	13
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 10:44	Mark A Clark	1

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Analysis Report

Lancaster Laboratories Sample No. SW 4316677

881-1 Grab Soil Sample
SUN: 881

Collected:07/22/2004 10:50 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

881-1

03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:14	Nadine Pegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4316678

881-2 Grab Soil Sample
SUN: 881

Collected: 07/22/2004 11:10 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

881-2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.5		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	11.		1.0	ug/kg	11
08184	Toluene	108-88-3	32.		1.0	ug/kg	11
08185	Ethylbenzene	100-41-4	23.		1.0	ug/kg	11
08188	Isopropylbenzene	98-82-8	84.		2.6	ug/kg	11
08189	Naphthalene	91-20-3	N.D.		1,200.	ug/kg	11
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.						
	Due to the nature of the sample matrix, normal reporting limits were not attained.						
	A poor surrogate recovery was observed. The analysis was repeated and a poor surrogate recovery was again observed indicating a significant matrix effect.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	69.	J	24.	ug/kg	5
01007	Phenanthrene	85-01-8	250.		12.	ug/kg	5
01008	Anthracene	120-12-7	57.		3.6	ug/kg	5
01012	Pyrene	129-00-0	120.	J	28.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	18.	J	7.9	ug/kg	5
01016	Chrysene	218-01-9	65.	J	12.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	19.	J	16.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	21.	J	12.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		20.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		16.	ug/kg	5
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

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Analysis Report

Lancaster Laboratories Sample No. SW 4316678

881-2 Grab Soil Sample
SUN: 881

Collected:07/22/2004 11:10 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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102 Pickering Way
Suite 200
Exton PA 19341

881-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 10:19	Stephanie A Selis	11
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/29/2004 23:24	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:16	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4316679

881-3 Grab Soil Sample
SUN: 881

Collected:07/22/2004 11:30 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	9.1		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.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		20.	ug/kg	222
08184	Toluene	108-88-3	250.		20.	ug/kg	222
08185	Ethylbenzene	100-41-4	300.		20.	ug/kg	222
08188	Isopropylbenzene	98-82-8	850.		49.	ug/kg	222
08189	Naphthalene	91-20-3	3,400.		98.	ug/kg	222
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.						
	Due to the nature of the sample matrix, normal reporting limits were not attained.						
	Poor surrogate recoveries were observed for this sample due to the dilution needed to perform the analysis.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	240.	J	220.	ug/kg	5
01007	Phenanthrene	85-01-8	610.	J	110.	ug/kg	5
01008	Anthracene	120-12-7	170.	J	33.	ug/kg	5
01012	Pyrene	129-00-0	390.	J	260.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	N.D.		73.	ug/kg	5
01016	Chrysene	218-01-9	N.D.		740.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	N.D.		150.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	N.D.		110.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		180.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		150.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

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Analysis Report

Lancaster Laboratories Sample No. SW 4316679

881-3 Grab Soil Sample
SUN: 881

Collected:07/22/2004 11:30 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

The usual reporting limits could not be attained due to the matrix of the sample or interferences observed in the HPLC PAH analysis.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for chrysene. The reporting limit for this compound was raised accordingly.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 10:56	Stephanie A Selis	222
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 00:06	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:17	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4316680

881-4 Grab Soil Sample
SUN: 881

Collected: 07/22/2004 11:50 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.2		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		1.1	ug/kg	12
08184	Toluene	108-88-3	2.7	J	1.1	ug/kg	12
08185	Ethylbenzene	100-41-4	N.D.		1.1	ug/kg	12
08188	Isopropylbenzene	98-82-8	N.D.		2.8	ug/kg	12
08189	Naphthalene	91-20-3	13.		5.5	ug/kg	12
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.						
	A poor surrogate recovery was observed. The analysis was repeated and a poor surrogate recovery was again observed indicating a significant matrix effect.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		230.	ug/kg	5
01007	Phenanthrene	85-01-8	N.D.		120.	ug/kg	5
01008	Anthracene	120-12-7	N.D.		35.	ug/kg	5
01012	Pyrene	129-00-0	N.D.		270.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	78.	J	77.	ug/kg	5
01016	Chrysene	218-01-9	N.D.		120.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	N.D.		150.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	N.D.		120.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		190.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		150.	ug/kg	5
	The usual reporting limits could not be attained due to the matrix of the sample or interferences observed in the HPLC PAH analysis.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

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Analysis Report

Lancaster Laboratories Sample No. SW 4316680

881-4 Grab Soil Sample
SUN: 881

Collected:07/22/2004 11:50 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-4

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 11:34	Stephanie A Selis	12
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 00:48	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:19	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4316681

881-5 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:10 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-5

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	7.1		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.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		180.	ug/kg	2103
08184	Toluene	108-88-3	1,700.		180.	ug/kg	2103
08185	Ethylbenzene	100-41-4	N.D.		180.	ug/kg	2103
08188	Isopropylbenzene	98-82-8	5,800.		450.	ug/kg	2103
08189	Naphthalene	91-20-3	31,000.		910.	ug/kg	2103
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. A poor surrogate recovery was observed due to the dilution needed to perform the analysis.						
	Due to the nature of the sample matrix, normal reporting limits were not attained.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	1,800.	J	430.	ug/kg	5
01007	Phenanthrene	85-01-8	4,200.		220.	ug/kg	5
01008	Anthracene	120-12-7	890.		65.	ug/kg	5
01012	Pyrene	129-00-0	1,600.	J	500.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	N.D.		140.	ug/kg	5
01016	Chrysene	218-01-9	N.D.		220.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	N.D.		290.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	N.D.		220.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		360.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		290.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						
	The usual reporting limits could not be attained due to the matrix of the sample or interferences observed in the HPLC PAH analysis.						

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Analysis Report

Lancaster Laboratories Sample No. SW 4316681

881-5 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:10 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-5

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 12:11	Stephanie A Selis	2103
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 01:30	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:20	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. SW 4316682

881-6 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:20 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-6

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.6		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		320.	ug/kg	3788
08184	Toluene	108-88-3	N.D.		320.	ug/kg	3788
08185	Ethylbenzene	100-41-4	N.D.		320.	ug/kg	3788
08188	Isopropylbenzene	98-82-8	N.D.		810.	ug/kg	3788
08189	Naphthalene	91-20-3	20,000.		1,600.	ug/kg	3788
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. A poor surrogate recovery was observed due to the dilution needed to perform the analysis.						
	Due to the nature of the sample matrix, normal reporting limits were not attained.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	N.D.		430.	ug/kg	5
01007	Phenanthrene	85-01-8	660.	J	210.	ug/kg	5
01008	Anthracene	120-12-7	360.	J	64.	ug/kg	5
01012	Pyrene	129-00-0	920.	J	500.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	N.D.		140.	ug/kg	5
01016	Chrysene	218-01-9	N.D.		210.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	N.D.		290.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	N.D.		210.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		360.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		290.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						
	The usual reporting limits could not be attained due to the matrix of the sample or interferences observed in the HPLC PAH analysis.						

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Analysis Report

Lancaster Laboratories Sample No. SW 4316682

881-6 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:20 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-6

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 12:49	Stephanie A Selis	3788
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 02:12	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:21	Nadine Fegley	n.a.

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Analysis Report

REPRINT

Lancaster Laboratories Sample No. SW 4316683

881-7 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:30 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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Exton PA 19341

881-7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	2.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	N.D.		200.	ug/kg	2439
08184	Toluene	108-88-3	330.	J	200.	ug/kg	2439
08185	Ethylbenzene	100-41-4	N.D.		500.	ug/kg	2439
08188	Isopropylbenzene	98-82-8	2,900.		500.	ug/kg	2439
08189	Naphthalene	91-20-3	18,000.		1,000.	ug/kg	2439
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. A poor surrogate recovery was observed due to the dilution needed to perform the analysis.						
	Due to the nature of the sample matrix, normal reporting limits were not attained.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	490.	J	210.	ug/kg	5
01007	Phenanthrene	85-01-8	1,100.		100.	ug/kg	5
01008	Anthracene	120-12-7	240.	J	31.	ug/kg	5
01012	Pyrene	129-00-0	540.	J	240.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	N.D.		69.	ug/kg	5
01016	Chrysene	218-01-9	N.D.		100.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	N.D.		140.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	N.D.		100.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		170.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	N.D.		140.	ug/kg	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.						
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						
	The usual reporting limits could not be attained due to the matrix of the sample or interferences observed in the HPLC PAH analysis.						

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Analysis Report

Lancaster Laboratories Sample No. SW 4316683

881-7 Grab Soil Sample
SUN: 881

Collected:07/22/2004 12:30 by SM

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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881-7

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	07/27/2004 17:26	Scott W Freisher	1
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 13:27	Stephanie A Selis	2439
00941	PAH's in Solids by HPLC	SW-846 8310	1	07/30/2004 02:54	Mark A Clark	5
03338	PAH Solid Extraction	SW-846 3550B	1	07/27/2004 10:00	Olivia Arosemena	1
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:22	Nadine Fegley	n.a.

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Analysis Report

Lancaster Laboratories Sample No. G5 4316684

Trip Blank Methanol Sample
SUN: 881

Collected: n.a.

Account Number: 11183

Submitted: 07/23/2004 16:05
Reported: 10/01/2004 at 12:07
Discard: 10/16/2004

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TBMET

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08179	BTEX/MTBE/Isopropylbenz/Napht.					
08183	Benzene	71-43-2	N.D.	2.0	ug/kg	25
08184	Toluene	108-88-3	N.D.	2.0	ug/kg	25
08185	Ethylbenzene	100-41-4	N.D.	2.0	ug/kg	25
08188	Isopropylbenzene	98-82-8	N.D.	5.0	ug/kg	25
08189	Naphthalene	91-20-3	N.D.	10.	ug/kg	25

The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08179	BTEX/MTBE/Isopropylbenz/Napht.	SW-846 8021B	1	07/27/2004 09:03	Stephanie A Selis	25
06169	Field Preserved MeOH Dept 25	SW-846 5035	1	07/26/2004 11:23	Nadine Fegley	n.a.

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc.
Reported: 10/01/04 at 12:07 PM

Group Number: 904975

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 04208SLD026	Sample number(s): 4316677-4316683							
Fluorene	N.D.	4.0	ug/kg	91		71-106		
Phenanthrene	N.D.	2.0	ug/kg	91		73-112		
Anthracene	N.D.	0.60	ug/kg	89		68-117		
Pyrene	N.D.	4.7	ug/kg	90		67-117		
Benzo(a)anthracene	N.D.	1.3	ug/kg	91		72-115		
Chrysene	N.D.	2.0	ug/kg	90		71-108		
Benzo(b)fluoranthene	N.D.	2.7	ug/kg	92		74-118		
Benzo(a)pyrene	N.D.	2.0	ug/kg	89		68-116		
Indeno(1,2,3-cd)pyrene	N.D.	3.3	ug/kg	94		76-127		
Benzo(g,h,i)perylene	N.D.	2.7	ug/kg	94		73-116		
Batch number: 04209820003A	Sample number(s): 4316680-4316683							
Moisture				100		99-101		
Batch number: 04209820003B	Sample number(s): 4316677-4316679							
Moisture				100		99-101		
Batch number: 04209A31A	Sample number(s): 4316677-4316684							
Benzene	N.D.	2.0	ug/kg	100	99	86-113	1	30
Toluene	N.D.	2.0	ug/kg	92	92	88-113	0	30
Ethylbenzene	N.D.	2.0	ug/kg	102	102	89-112	0	30
Isopropylbenzene	N.D.	5.0	ug/kg	103	102	91-111	0	30
Naphthalene	N.D.	10.	ug/kg	88	93	70-125	5	30

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 04208SLD026	Sample number(s): 4316677-4316683								
Fluorene	85	86	69-103	2	50				
Phenanthrene	67	171*	41-153	65*	50				
Anthracene	47	62	1-158	21	50				
Pyrene	72	101	3-143	26	50				
Benzo(a)anthracene	13*	84*	28-54	62*	50				
Chrysene	69	102	1-169	28	50				
Benzo(b)fluoranthene	40*	173*	47-122	54*	50				
Benzo(a)pyrene	29*	181*	45-139	59*	50				
Indeno(1,2,3-cd)pyrene	73	87	1-198	15	50				
Benzo(g,h,i)perylene	73	92	34-123	18	50				

*- 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.

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 904975
Reported: 10/01/04 at 12:07 PM

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 04209820003A	Sample number(s): 4316680-4316683								
Moisture						14.9	13.7	9	15
Batch number: 04209820003B	Sample number(s): 4316677-4316679								
Moisture						8.7	7.7	12	15

Surrogate Quality Control

Analysis Name: PAH's in Solids by HPLC
Batch number: 04208SLD026

	Nitrobenzene	Triphenylene
4316677	84	105
4316678	79	144
4316679	79	274*
4316680	81	116
4316681	90	943*
4316682	77	593*
4316683	82	362*
Blank	94	101
LCS	95	102
MS	92	106
MSD	88	119
Limits:	59-121	48-161

Analysis Name: BTEX/MTBE/Isopropylbenz/Napht.
Batch number: 04209A31A

	Trifluorotoluene-P
4316677	85
4316678	68*
4316679	4*
4316680	70*
4316681	1*
4316682	0*
4316683	0*
4316684	109
Blank	106
LCS	111
LCSD	108
Limits:	72-122

*- 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.

Analysis Request / Environmental Services Chain of Custody

Lancaster Laboratories
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For Lancaster Laboratories use only
Acct. # 11183 Group# 904975 Sample # 4316677-84

COC # 0061445

1 OF 1

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: SECOR Acct. #:
Project Name/#: SUNOCO - 881 PWSID #:
Project Manager: S. MORESCALCHI P.O.#:
Sampler: S. MORESCALCHI Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR #: 1192294

(2)

Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	Matrix: Soil	Water (☐ Potable ☐ NPDES Check if Applicable)	Other	(4) Total # of Containers	(5) Analyses Requested: PADEP SHORT LISTS - FUEL OIL #4,5&6 & USED MOTOR OIL (NO LEAD)	SPLP - FUEL OIL 4,5&6 USED MOTOR OIL							Remarks	(6) Temperature of samples upon receipt (if requested)
881-1	07-22-04	1050	✓		✓			3	✓								005466	HOLD SPLP
881-2	↓	1110	✓		✓			3	✓								005467	↓
881-3		1130	✓		✓			3	✓								005468	
881-4		1150	✓		✓			3	✓								005469	
881-5		1210	✓		✓			3	✓								005470	
881-6		1220	✓		✓			3	✓								005471	
881-7		1230	✓		✓			3	✓								005472	
TRIP BLANK	LAB						✓	1	✓								* MEET PADEP MSCs * temp 3°C TJB 7/23/04	

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush P-7
(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
[signature]	7-22-04	1418	[signature]	7/23/04	0718
[signature]	7/23/04	0850			
[signature]	07-22-04	0945	L I Wolf	7/23/04	0945
L I Wolf	7/23/04	1605			
			Jessica Barr	7/23/04	1605

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2102 Rev. 10/27/02

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2425 New Holland Pike • Lancaster, PA 17601

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
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
ug	microgram(s)	**mg**	milligram(s)
ml	milliliter(s)	**l**	liter(s)
m3	cubic meter(s)	**ul**	microliter(s)

< 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

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

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. All other results are reported on an as-received basis.

U.S. EPA CLP 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 quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
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 sample 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.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions 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:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 911206. Samples arrived at the laboratory on Wednesday, September 08, 2004. The PO# for this group is AST 880.

Client Description	Lancaster Labs Number
880-14 Grab Soil Sample	4347780

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Michele A. Jarosick

Michele A. Jarosick
Senior Chemist, Coordinator

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. SW 4347780

880-14 Grab Soil Sample
SUNOCO 880

Collected:09/07/2004 14:20 by SM

Account Number: 11183

Submitted: 09/08/2004 19:30
Reported: 09/21/2004 at 16:02
Discard: 10/22/2004

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341

88014

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.8		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
08179	BTEX/MTBE/Isopropylbenz/Napht.						
08183	Benzene	71-43-2	14.		2.1	ug/kg	22
08184	Toluene	108-88-3	37.		2.1	ug/kg	22
08185	Ethylbenzene	100-41-4	N.D.		24.	ug/kg	22
08188	Isopropylbenzene	98-82-8	31.		5.4	ug/kg	22
08189	Naphthalene	91-20-3	220.		11.	ug/kg	22
	The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately. Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for ethylbenzene. The presence or concentration of this compound cannot be determined due to the presence of this interferent.						
00941	PAH's in Solids by HPLC						
00974	Fluorene	86-73-7	26.	J	24.	ug/kg	5
01007	Phenanthrene	85-01-8	160.		12.	ug/kg	5
01008	Anthracene	120-12-7	21.	J	3.6	ug/kg	5
01012	Pyrene	129-00-0	190.		28.	ug/kg	5
01014	Benzo(a)anthracene	56-55-3	63.		8.1	ug/kg	5
01016	Chrysene	218-01-9	85.		12.	ug/kg	5
01017	Benzo(b)fluoranthene	205-99-2	85.		16.	ug/kg	5
01019	Benzo(a)pyrene	50-32-8	99.		12.	ug/kg	5
01025	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		20.	ug/kg	5
01026	Benzo(g,h,i)perylene	191-24-2	100.		16.	ug/kg	5
	Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.						

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

Lancaster Laboratories

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 911206
Reported: 09/21/04 at 04:02 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 MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 04253820003B	Sample number(s): 4347780							
Moisture				100		99-101		
Batch number: 04253SLB026	Sample number(s): 4347780							
Fluorene	N.D.	4.0	ug/kg	89		71-106		
Phenanthrene	N.D.	2.0	ug/kg	89		73-112		
Anthracene	N.D.	0.60	ug/kg	90		68-117		
Pyrene	N.D.	4.7	ug/kg	89		67-117		
Benzo(a)anthracene	N.D.	1.3	ug/kg	90		72-115		
Chrysene	N.D.	2.0	ug/kg	90		71-108		
Benzo(b)fluoranthene	N.D.	2.7	ug/kg	94		74-118		
Benzo(a)pyrene	N.D.	2.0	ug/kg	86		68-116		
Indeno(1,2,3-cd)pyrene	N.D.	3.3	ug/kg	91		76-127		
Benzo(g,h,i)perylene	N.D.	2.7	ug/kg	90		73-116		
Batch number: 04256A31A	Sample number(s): 4347780							
Benzene	N.D.	2.0	ug/kg	98		86-113		
Toluene	N.D.	2.0	ug/kg	90		81-119		
Ethylbenzene	N.D.	2.0	ug/kg	99		89-112		
Isopropylbenzene	N.D.	5.0	ug/kg	100		91-111		
Naphthalene	N.D.	10.	ug/kg	88		70-125		

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 04253820003B	Sample number(s): 4347780								
Moisture						82.0	81.9	0	15
Batch number: 04253SLB026	Sample number(s): 4347780								
Fluorene	83	83	69-103	0	50				
Phenanthrene	-56*	-42*	41-153	12	50				
Anthracene	39	40	1-158	1	50				
Pyrene	46	26	3-143	15	50				
Benzo(a)anthracene	-61*	-75*	28-54	10	50				
Chrysene	36	31	1-169	4	50				
Benzo(b)fluoranthene	(2)	(2)	47-122	23	50				
Benzo(a)pyrene	(2)	(2)	45-139	29	50				
Indeno(1,2,3-cd)pyrene	60	73	1-198	11	50				
Benzo(g,h,i)perylene	74	49	34-123	16	50				

*- 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.

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 911206
Reported: 09/21/04 at 04:02 PM

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 04256A31A	Sample number(s): 4347780								
Benzene	79	85	52-135	8	30				
Toluene	72	78	59-129	9	30				
Ethylbenzene	79	87	56-132	9	30				
Isopropylbenzene	80	88	63-112	9	30				
Naphthalene	76	87	53-122	13	30				

Surrogate Quality Control

Analysis Name: PAH's in Solids by HPLC
Batch number: 04253SLB026

	Nitrobenzene	Triphenylene
4347780	87	141
Blank	89	100
LCS	86	97
MS	87	524*
MSD	87	222*
Limits:	59-121	48-161

Analysis Name: BTEX/MTBE/Isopropylbenz/Napht.
Batch number: 04256A31A

	Trifluorotoluene-P
4347780	104
Blank	108
LCS	111
MS	80
MSD	85
Limits:	72-122

*- 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.

Analysis Request / Environmental Services Chain of Custody

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For Lancaster Laboratories use only
Acct. # 11182 Group# 911206 Sample # 4347780

COC # 0068066

1 OF 1

Please print. Instructions on reverse side correspond with circled numbers.

1
Client: SECOR Acct. #:
Project Name/#: SUNOCO - 880 PWSID #:
Project Manager: S. MORESCALCHI P.O.#:
Sampler: S. MORESCALCHI Quote #:
Name of state where samples were collected: PA

2 Sample Identification	Date Collected	Time Collected	3 Grab	Composite	Matrix: Soil	Water	Other	4 Total # of Containers	5 Analyses Requested: PADEP Short List + Used Motor Oil + CNO Lead; SPLP - Fuel Oil + Used Motor Oil	Remarks
880-14	09.07.04	1420	✓		✓			4	✓	VIAL # 011478 HOLD SPLP * MEET PADEP MRC's *

Potable Check if Applicable ☐ NPDES ☐

For Lab Use Only
FSC:
SCR #: 1194413

6 Preservation codes: (1) Preservation # (2) Preservation # (3) Preservation # (4) Preservation #

5.8°C
9/8/04
RL

7 **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: 8-7
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

Relinquished by:	Date	Time	Received by:	Date	Time
K. Hunt	9-2-04	1430			
	09-07-04	080	Marvin McFadden	9/8/04	9:50
Marvin McFadden	9/8/04	19:30			
			Jessica Bomberger	9/8/04	1930

9

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Lancaster Laboratories
2425 New Holland Pike • Lancaster, PA 17601

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
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
ug	microgram(s)	**mg**	milligram(s)
ml	milliliter(s)	**l**	liter(s)
m3	cubic meter(s)	**ul**	microliter(s)

< 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

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

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. All other results are reported on an as-received basis.

U.S. EPA CLP 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 quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
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 sample 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.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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APPENDIX B

Laboratory Analytical Report
July 22, 2004 SPLP Analytical Results

Lancaster Laboratories

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Analysis Report

ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 906716. Samples arrived at the laboratory on Thursday, August 05, 2004. The PO# for this group is 881.

Client Description	Lancaster Labs Number
881-1 Grab Soil Sample	4325359
881-2 Grab Soil Sample	4325360
881-3 Grab Soil Sample	4325361
881-4 Grab Soil Sample	4325362
881-5 Grab Soil Sample	4325363
881-6 Grab Soil Sample	4325364
881-7 Grab Soil Sample	4325365

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Lancaster Laboratories

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Analysis Report

Questions? Contact your Client Services Representative
Sandra L Patton at (717) 656-2300.

Respectfully Submitted,

Michele A. Jarosick

Michele A. Jarosick
Senior Chemist, Coordinator

Lancaster Laboratories

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Analysis Report

Lancaster Laboratories Sample No. TL 4325359

881-1 Grab Soil Sample
SPLP NVE Re-entry of LL #4316677
SUN: 881
Collected: 07/22/2004 10:50 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:25
Discard: 09/01/2004

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SPL11

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	3.5	J	1.6	ug/l	1
00782	Acenaphthylene	208-96-8	N.D.		1.6	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		1.6	ug/l	1
00784	Fluorene	86-73-7	0.55	J	0.18	ug/l	1
00785	Phenanthrene	85-01-8	3.0		0.078	ug/l	1
00789	Anthracene	120-12-7	0.47		0.039	ug/l	1
00807	Fluoranthene	206-44-0	0.49		0.039	ug/l	1
00811	Pyrene	129-00-0	0.68	J	0.18	ug/l	1
00812	Benzo(a)anthracene	56-55-3	0.031	J	0.020	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.039	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.020	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.039	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.078	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.098	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.078	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.020	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 03:22	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325360

881-2 Grab Soil Sample
SPLP NVE Re-entry of LL #4316678
SUN: 881
Collected:07/22/2004 11:10 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:25
Discard: 09/01/2004

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SPL12

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	1.7	J	1.5	ug/l	1
00782	Acenaphthylene	208-96-8	N.D.		1.5	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		1.5	ug/l	1
00784	Fluorene	86-73-7	0.78		0.17	ug/l	1
00785	Phenanthrene	85-01-8	1.5		0.077	ug/l	1
00789	Anthracene	120-12-7	0.31		0.039	ug/l	1
00807	Fluoranthene	206-44-0	0.23		0.039	ug/l	1
00811	Pyrene	129-00-0	0.18	J	0.17	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.		0.019	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.039	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.019	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.039	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.077	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.096	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.077	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.019	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 04:01	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325361

881-3 Grab Soil Sample
SPLP NVE Re-entry of LL #4316679
SUN: 881
Collected:07/22/2004 11:30 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:25
Discard: 09/01/2004

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SPL13

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	N.D.		1.6	ug/l	1
00782	Acenaphthylene	208-96-8	2.5	J	1.6	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		1.6	ug/l	1
00784	Fluorene	86-73-7	0.89		0.18	ug/l	1
00785	Phenanthrene	85-01-8	0.88		0.078	ug/l	1
00789	Anthracene	120-12-7	0.20		0.039	ug/l	1
00807	Fluoranthene	206-44-0	0.15	J	0.039	ug/l	1
00811	Pyrene	129-00-0	0.18	J	0.18	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.		0.020	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.039	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.020	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.039	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.078	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.098	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.078	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.020	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 04:39	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325362

881-4 Grab Soil Sample
SPLP NVE Re-entry of LL #4316680
SUN: 881
Collected: 07/22/2004 11:50 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:26
Discard: 09/01/2004

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SPL14

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	N.D.	1.6	ug/l	1
00782	Acenaphthylene	208-96-8	N.D.	1.6	ug/l	1
00783	Acenaphthene	83-32-9	N.D.	1.6	ug/l	1
00784	Fluorene	86-73-7	N.D.	0.17	ug/l	1
00785	Phenanthrene	85-01-8	N.D.	0.078	ug/l	1
00789	Anthracene	120-12-7	N.D.	0.039	ug/l	1
00807	Fluoranthene	206-44-0	N.D.	0.039	ug/l	1
00811	Pyrene	129-00-0	N.D.	0.17	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.	0.019	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.	0.039	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.	0.019	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	0.039	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.078	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.	0.097	ug/l	1
07409	Chrysene	218-01-9	N.D.	0.078	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.	0.019	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 05:18	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325363

881-5 Grab Soil Sample
SPLP NVE Re-entry of LL #4316681
SUN: 881
Collected:07/22/2004 12:10 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:26
Discard: 09/01/2004

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SPL15

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	39.		2.0	ug/l	1
00782	Acenaphthylene	208-96-8	7.1	J	2.0	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		2.0	ug/l	1
00784	Fluorene	86-73-7	2.6		0.23	ug/l	1
00785	Phenanthrene	85-01-8	2.7		0.10	ug/l	1
00789	Anthracene	120-12-7	0.31		0.051	ug/l	1
00807	Fluoranthene	206-44-0	0.25	J	0.051	ug/l	1
00811	Pyrene	129-00-0	N.D.		0.23	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.		0.025	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.051	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.025	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.051	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.10	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.13	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.10	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.025	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 05:56	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325364

881-6 Grab Soil Sample
SPLP NVE Re-entry of LL #4316682
SUN: 881
Collected:07/22/2004 12:20 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:26
Discard: 09/01/2004

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SPL16

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	N.D.		2.3	ug/l	1
00782	Acenaphthylene	208-96-8	6.3	J	2.3	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		2.3	ug/l	1
00784	Fluorene	86-73-7	0.84	J	0.25	ug/l	1
00785	Phenanthrene	85-01-8	0.73		0.11	ug/l	1
00789	Anthracene	120-12-7	0.19	J	0.056	ug/l	1
00807	Fluoranthene	206-44-0	N.D.		0.30	ug/l	1
00811	Pyrene	129-00-0	N.D.		0.25	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.		0.028	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.056	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.028	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.056	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.11	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.14	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.11	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.028	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for fluoranthene. The reporting limit for this compound was raised accordingly.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 06:35	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Lancaster Laboratories Sample No. TL 4325365

881-7 Grab Soil Sample
SPLP NVE Re-entry of LL #4316683
SUN: 881
Collected:07/22/2004 12:30 by SM

Account Number: 11183

Submitted: 08/05/2004 17:00
Reported: 08/17/2004 at 13:26
Discard: 09/01/2004

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Exton PA 19341

SPL17

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit	Units	Dilution Factor
00774	PAH's in Water by HPLC						
00775	Naphthalene	91-20-3	16.		1.6	ug/l	1
00782	Acenaphthylene	208-96-8	7.5	J	1.6	ug/l	1
00783	Acenaphthene	83-32-9	N.D.		1.6	ug/l	1
00784	Fluorene	86-73-7	2.3		0.18	ug/l	1
00785	Phenanthrene	85-01-8	3.2		0.079	ug/l	1
00789	Anthracene	120-12-7	0.43		0.039	ug/l	1
00807	Fluoranthene	206-44-0	0.40		0.039	ug/l	1
00811	Pyrene	129-00-0	0.36	J	0.18	ug/l	1
00812	Benzo(a)anthracene	56-55-3	0.024	J	0.020	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.		0.039	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.		0.020	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.		0.039	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.079	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.		0.098	ug/l	1
07409	Chrysene	218-01-9	N.D.		0.079	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.		0.020	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00774	PAH's in Water by HPLC	SW-846 8310	1	08/11/2004 07:52	Mark A Clark	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	08/05/2004 14:50	Zachary S Dennis	n.a.
03337	PAH Water Extraction	SW-846 3510C	1	08/09/2004 17:30	JoElla L Rice	1

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 906716
Reported: 08/17/04 at 01:26 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 MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 04222WAC026	Sample number(s): 4325359-4325365							
Naphthalene	N.D.	1.6	ug/l	74	83	57-109	11	30
Acenaphthylene	N.D.	1.6	ug/l	78	85	56-115	8	30
Acenaphthene	N.D.	1.6	ug/l	79	84	60-116	7	30
Fluorene	N.D.	0.18	ug/l	81	86	61-116	6	30
Phenanthrene	N.D.	0.080	ug/l	85	89	67-115	4	30
Anthracene	N.D.	0.040	ug/l	86	90	68-113	5	30
Fluoranthene	N.D.	0.040	ug/l	87	89	70-112	3	30
Pyrene	N.D.	0.18	ug/l	86	87	69-113	2	30
Benzo(a)anthracene	N.D.	0.020	ug/l	86	88	73-114	2	30
Benzo(b)fluoranthene	N.D.	0.040	ug/l	87	89	72-113	3	30
Benzo(a)pyrene	N.D.	0.020	ug/l	81	84	68-112	4	30
Dibenz(a,h)anthracene	N.D.	0.040	ug/l	61	47	19-129	27	30
Indeno(1,2,3-cd)pyrene	N.D.	0.080	ug/l	70	74	54-121	6	30
Benzo(g,h,i)perylene	N.D.	0.10	ug/l	58	37	6-122	45*	30
Chrysene	N.D.	0.080	ug/l	84	86	70-111	2	30
Benzo(k)fluoranthene	N.D.	0.020	ug/l	87	91	72-119	4	30

Surrogate Quality Control

Analysis Name: PAH's in Water by HPLC
Batch number: 04222WAC026

	Nitrobenzene	Triphenylene
4325359	95	92
4325360	87	94
4325361	95	95
4325362	100	91
4325363	102	96
4325364	106	102
4325365	88	92
Blank	104	101
LCS	84	96
LCSD	101	98
Limits:	63-154	59-131

*- 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.

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Analysis Report

Quality Control Summary

Client Name: Secor International, Inc.
Reported: 08/17/04 at 01:26 PM

Group Number: 906716

*- 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.

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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
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
ug	microgram(s)	**mg**	milligram(s)
ml	milliliter(s)	**l**	liter(s)
m3	cubic meter(s)	**ul**	microliter(s)

< 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

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

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. All other results are reported on an as-received basis.

U.S. EPA CLP 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 quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
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 sample 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.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions of Lancaster Laboratories and we hereby object to any conflicting terms contained in any acceptance or order submitted by client.

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
October 13, 2004

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

OCT 15 2004
By

Mr. Pat Chabeda
Sunoco, Inc
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145

Re: Storage Tank Program
Sunoco Inc Point Breeze
Facility ID No. 51-19781
3144 Passyunk Avenue
City of Philadelphia
Philadelphia County

Dear Mr. Chabeda:

On October 7, 2004 we received your report entitled "Remedial Action Completion Report", dated October 6, for the storage tank facility referenced above. We consider this submittal to be the Remedial Action Completion Report required by the Corrective Action Process regulations, 25 Pa. Code Section 245.313.

You have identified your selected cleanup standard as the Department's Site Specific Standard. As such, the Department will attempt to review this report within 90 days of its receipt and send a review letter to the facility owner.

If you have any questions concerning the requirements of the Corrective Action Process regulations, please contact me at (484) 250-5916.

Sincerely,

Stephan B. Sinding
Chief, Storage Tank Section
Environmental Cleanup

cc: Philadelphia County Health Department
City of Philadelphia
Mr. Morescalchi
Mr. Payne
Re 30 (CB04ECP) 287-3

sbaggett

From: sbaggett [sbaggett@secor.com]

Sent: Wednesday, November 24, 2004 3:34 PM

To: 'wpayne@state.pa.us'

Cc: Pat Chabeda (PACHABEDA@sunocoinc.com); Jim Oppenheim; Sergio Morescalchi (smorescalchi@secor.com)

Subject: Sunoco Point Breeze Process Area - Site Assessment Report for ASTs PB-880 and PB-881

Walter:

In follow-up to our conversation on October 28, 2004 regarding the vadoze zone transport modeling presented in the October 6, 2004 Site Assessment Report for ASTs PB-880 and PB-881 located in the Pont Breeze Processing Area of the Philadelphia Refinery, SECOR performed additional modeling scenarios.

As you will recall, your comments pertained to the solubility for benzene and the total organic carbon content. In the modeling included in the above-referenced report, we used a benzene solubility of 1780 mg/L (Chapter 250 PA Administrative Code Appendix A – Table 5). You requested that we use the calculator on the USEPA web-site to determine an effective solubility for benzene in crude oil (the release of concern was crude oil). You also requested that we looked at using an even more conservative value for organic carbon content of 0.25% (we had assumed a default value of 0.5% which was used by PADEP to develop its soil to groundwater buffer distances for Act 2). The results are described below.

Benzene Effective Solubility in Crude Oil

The EPA calculator requires that the user specify the Average Molecular Weight of the Fuel and the % mass fraction of the chemical of interest. As we discussed, there is variability in both of these parameters depending on the source of the crude oil. Using literature from the American Petroleum Institute we assumed and average benzene content of 1200 mg/kg or 0.12%. If we assume that the crude is a mid-range crude with an API gravity of 30, then its average boiling point range would be in the range of 600 to 650 degrees F which is in the distillate range between diesel fuel and lubrication oil. This could be anywhere in the range of 16 to 36 carbons. Assume an average of 26 carbons, then the average molecular weight would be around 350.

Using these values, the EPA calculator estimated an effective solubility for benzene in crude oil of 9.58 mg/L. This value seems very low, but we used it and a range of values to perform sensitivity analyses. Again, the actual values for the assumed parameters are dependant on the source of the oil.

Vadoze Zone Transport Modeling

We re-ran the same model (SESOIL) described in the above-referenced report using the same input assumptions with the exception of the solubility for benzene and the organic carbon content.

The modeling was performed to estimate the maximum benzene soil concentration that can remain at the site which will be protective of the Groundwater MSC of 5 ug/L (ppb) in pore space water immediately above the water table. The results of the sensitivity analyses for benzene solubility and organic carbon content are presented on the attached spreadsheet. The results appear to be more sensitive to the change in benzene solubility than organic carbon content over the range of these parameters evaluated.

As indicated, the lowest allowable soil benzene concentration estimated from the sensitivity analyses attached was 21 mg/Kg (assuming an organic carbon fraction of 0.5 % and a benzene solubility of 9.85 mg/l). An additional, more conservative modeling scenario was also performed using organic carbon fraction of 0.25 % and a benzene solubility of 9.85 mg/l. This reported an allowable soil benzene concentration of the 12 mg/Kg in soils. The highest benzene concentration reported at the site was 8 mg/Kg.

Even when considering the most conservative input parameters, the highest reported benzene concentration on-site is below the simulated soil concentration that is protective of groundwater. Note that these calculations were

performed to be protective of the benzene Groundwater MSC of 5 ug/L (ppb) in pore space water immediately above the water table. This is also a conservative assumption since there will be additional dilution and mixing with groundwater in the saturated zone beneath the area of interest.

Please contact me if you have any questions or concerns.

Thank You,

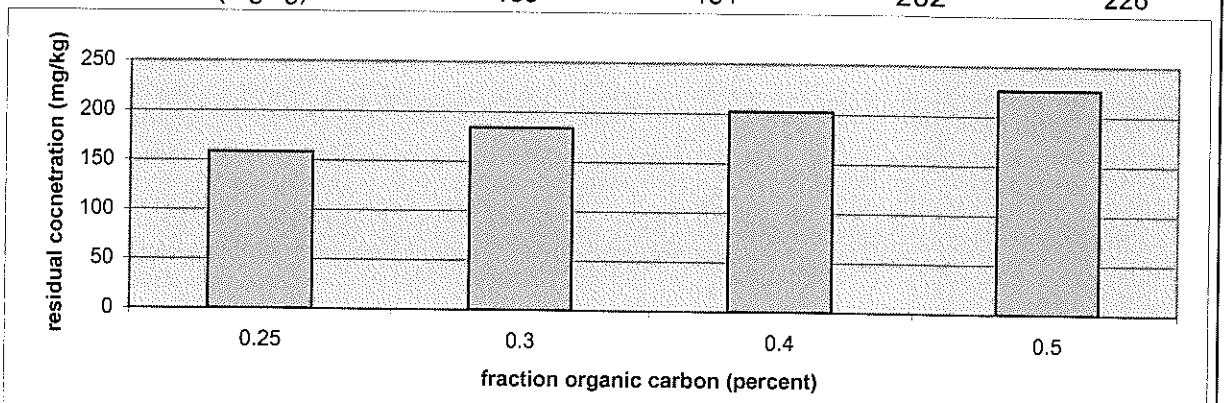
Steve Baggett, PG
Principal Hydrogeologist
SECOR International Incorporated
102 Pickering Way, Suite 200
Exton, PA 19341

tel: (484) 875-3075
fax: (484) 875-9286

SESOIL Sensitivity Analysis
AST 880
Sunococ Philadelphia Refinery

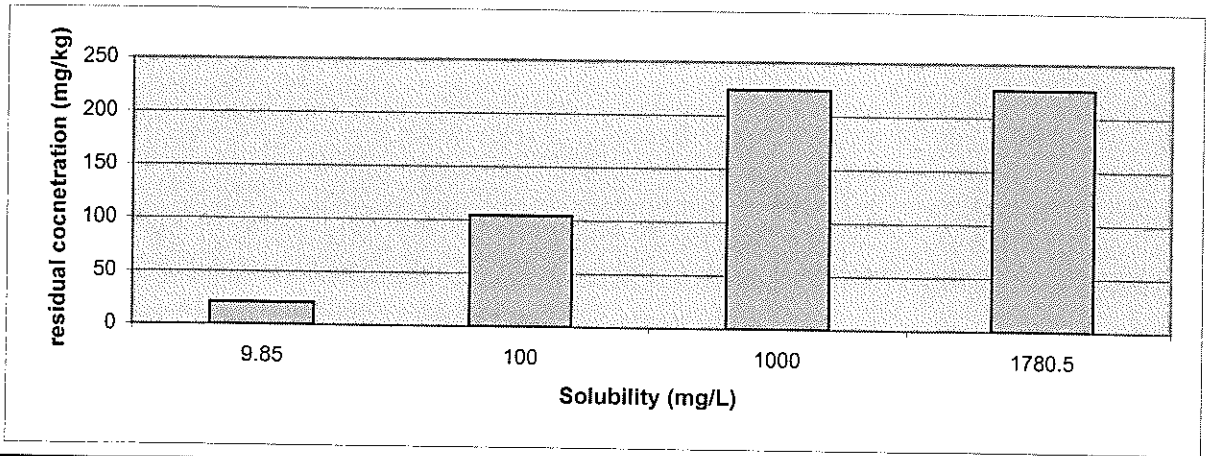
Fraction Organic Carbon Sensitivity

fraction organic carbon (%)	0.25	0.3	0.4	0.5
benzene solubility (mg/L)	1780.5	1780.5	1780.5	1780.5
residual concentration protective of MCL (5ppb) in soil pore space above water table (mg/kg)	158	184	202	226



Solubility Sensitivity

fraction organic carbon (%)	0.5	0.5	0.5	0.5
benzene solubility (mg/L)	9.85	100	1000	1780.5
residual concentration protective of MCL (5ppb) in soil pore space above water table) (mg/Kg)	21	104	224	226



December 21, 2005

Mr. Ron Rosendorn
Sunoco, Inc.
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

Subject: **Aboveground Storage Tank PB-881 (PA Reg #120A) Site Assessment Report**
Point Breeze Process Area, Philadelphia Refinery
Philadelphia, Pennsylvania
Facility ID #51-19781

Dear Mr. Rosendorn:

This letter summarizes the site assessment activities that were conducted in the vicinity of aboveground storage tank (AST) PB-881. The project site is located within the Sunoco, Inc. (Sunoco) Point Breeze Process Area, Philadelphia Refinery, located in Philadelphia, Pennsylvania (**Figure 1**). Site assessment activities consisted of confirmation soil sampling after remedial activities were completed.

On September 3, 2005, approximately 252 gallons of crude oil were released to the ground surface within the AST PB-881 tank berm through a leak in the east side of the tank floor. The majority of the released crude oil pooled by the east side of the AST. A small (less than 6-inches wide) stream of crude oil flowed around the raised berm that the AST is situated on and to the west before terminating near the west berm. The crude oil was recovered using a vacuum truck. Stained soils were removed and placed in roll-off dumpsters for disposal at Grows Landfill in Morrisville, Pennsylvania. AST 881 will be fully cleaned and inspected in order to determine the cause of the leak. Sunoco notified the Pennsylvania Department of Environmental Protection (PADEP) of the release and subsequent remedial activities in a letter dated September 13, 2005. The approximate extent of the release is depicted on **Figure 2**. As indicated on **Figure 2** and noted above, the oil that was released was confined within the tank berm.

Soil Sampling Activities

On October 26, 2005, a SECOR International Incorporated (SECOR) Professional Geologist certified in Pennsylvania collected six soil samples in order to verify that impacted material was removed. Soil samples designated 881-1 through 881-5 were collected within the release area at a depth of approximately 6 inches below ground surface using a hand trowel. Soil sample 881-6 was collected at a depth of approximately 6 inches from an area just beyond the excavated area. Soil sampling locations are depicted on **Figure 2**.

Laboratory Analyses of Soil Samples

The laboratory analysis selected for the soil samples was based on the product that was released. Therefore, each soil sample was analyzed for PADEP Pennsylvania Land Recycling Program (Act 2) short list of parameters for Fuel Oil numbers 4, 5 & 6 and used motor oil in soils. The list includes the analyses of benzene, toluene, ethlybenzene, isopropylbenzene and naphthalene by EPA Method 5035/8260B and anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, indeno (1,2,3-cd)pyrene, phenanthrene and pyrene by EPA Method 8270C. None of the soil samples were analyzed for total lead.

Soil Sampling Results

The soil analytical data is summarized on **Table 1.** Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by for PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils are based on direct contact exposure scenarios and PADEP has developed procedures for selecting MSCs for soils that are designed to protect groundwater from the potential impacts that could be caused by the migration of regulated substances from soils into the groundwater. Soil sample results were compared to Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B (revised November 24, 2001) of the Act 2 Rules and Regulations.

No soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs.

Conclusions

Since no soil samples exceeded the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs or Used Aquifer Nonresidential Soil-to-Groundwater MSCs, no further action is recommended.

Should you have any questions or comments, please feel free to contact me at (484) 875-3075.

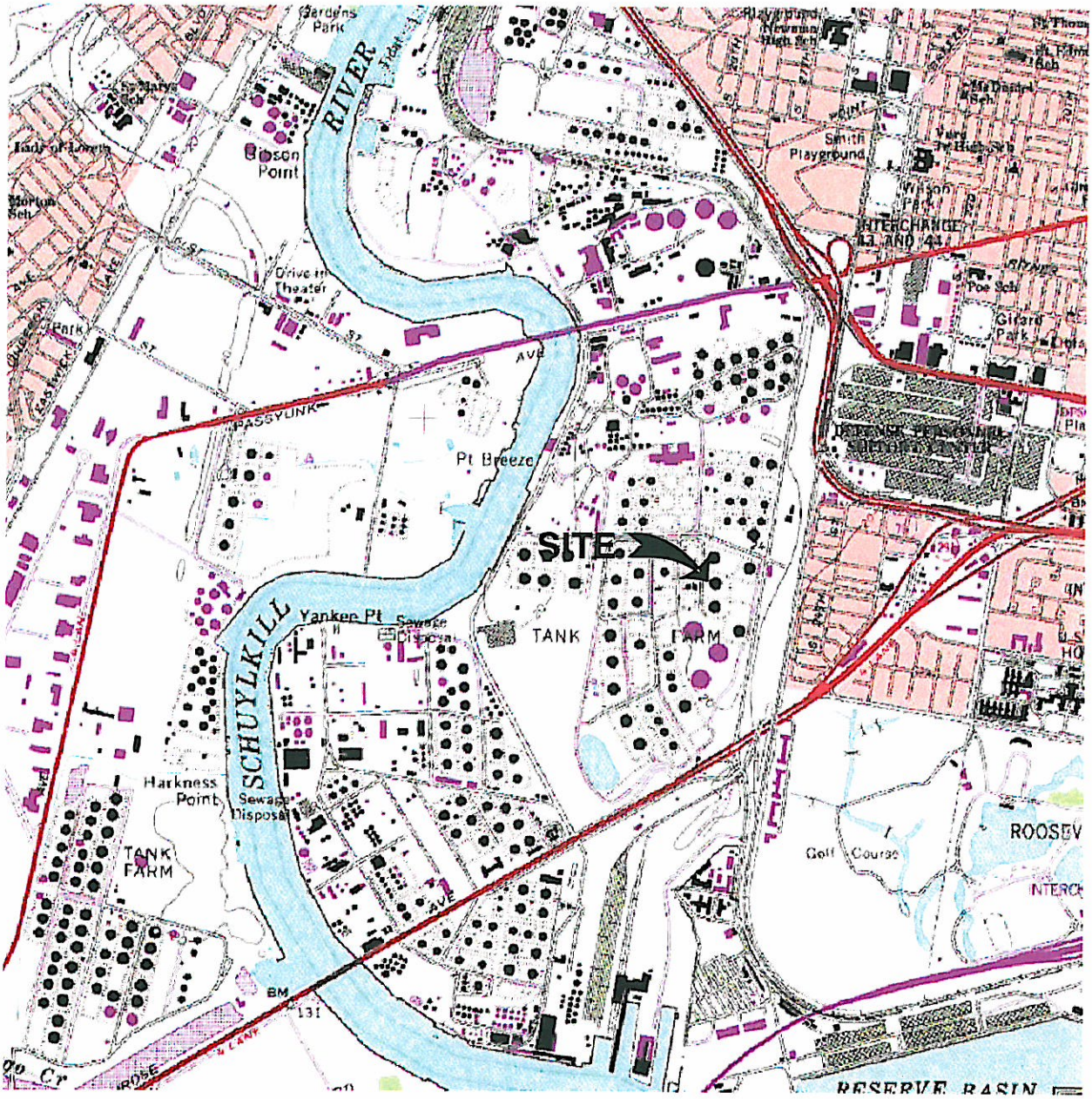
Sincerely,
SECOR International Incorporated

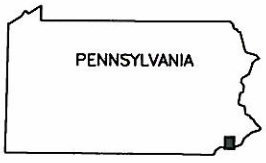
Sergio Morescalchi, P.G.

Project Geologist
PA Registered Geologist PG003847

c: James Oppenheim (Sunoco)
Project File

P:\Clients\Sunoco\AST Investigations\AST 881\AST 881 SAR Dec 2005.doc





QUADRANGLE LOCATION

N

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

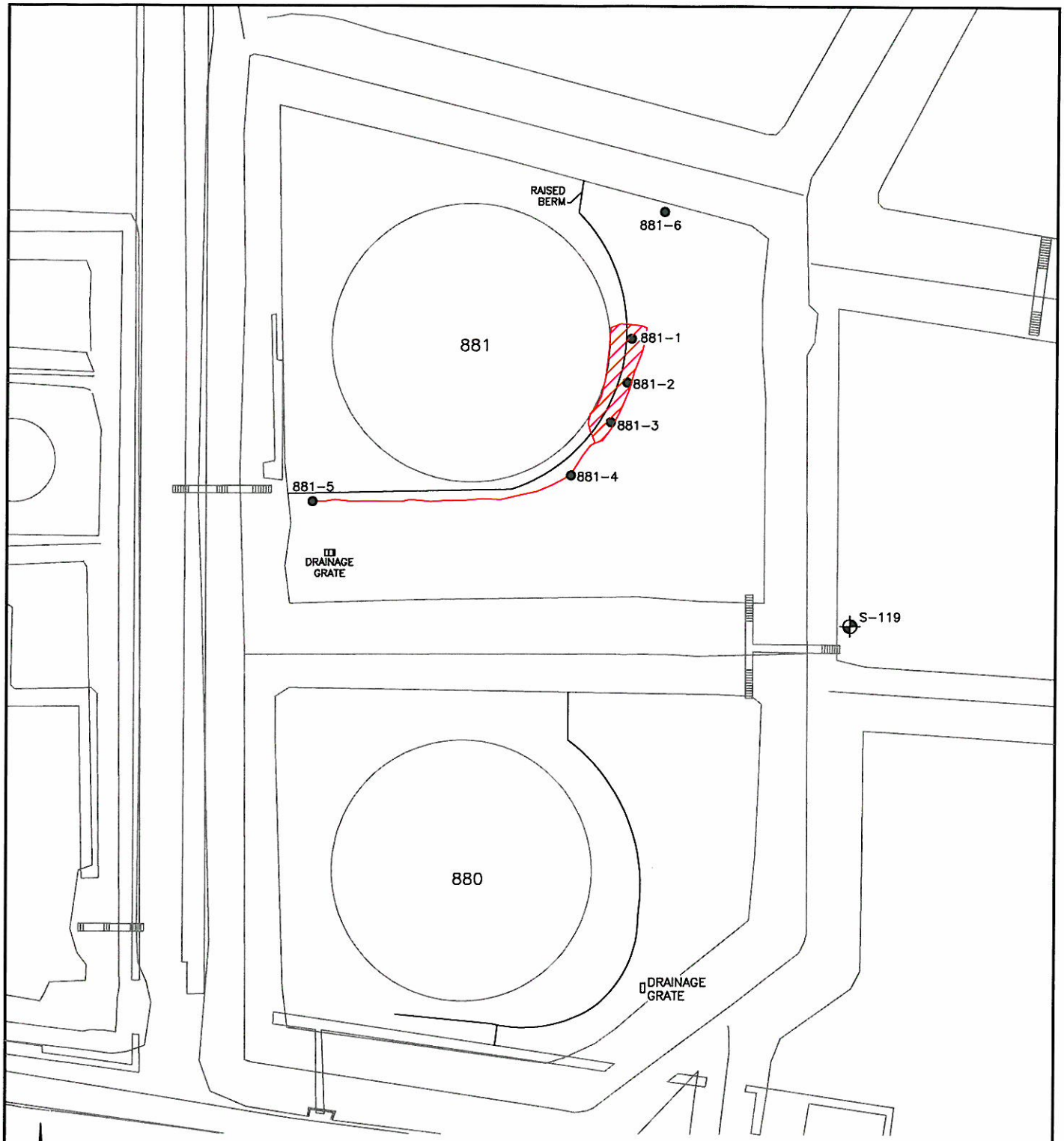
SITE LOCATION MAP
AST 881

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01019.02.0006	KEF	SM		12/13/2005

P:/Clients/Sunoco/AST Investigations/AST 881

62SU-1019-2-AST881-SL.DWG



REFERENCE: Basemap is provided by James M. Stewart, Inc.; 3028-01.dwg; 06/08/03

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-9286 (FAX)

FOR: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

AST 881
SOIL SAMPLE LOCATIONS

FIGURE: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
62SU.01019.02.0006	KEF	SM		12/13/2005

FILEPATH: P:/Clients/Sunoco/AST Inventigations/AST 881

62SU-1019-2-AST881-SB.DWG

TABLE

TABLE 1

Summary of Soil Analytical Results

AST 881
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

Sample Identification	881-1	881-2	881-3	881-4	881-5	881-6	MSCs		
Sample Collection Date	10/26/2005	10/26/2005	10/26/2005	10/26/2005	10/26/2005	10/26/2005	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-Residential (2)
VOCs									
Benzene	ND (23)	ND (28)	ND (21)	ND (27)	ND (27)	ND (24)	210,000	240,000	500
Toluene	ND (45)	ND (56)	ND (51)	ND (53)	ND (54)	ND (47)	10,000,000	10,000,000	100,000
Ethylbenzene	ND (45)	ND (56)	ND (51)	ND (53)	ND (54)	ND (47)	10,000,000	10,000,000	70,000
Isopropylbenzene	ND (45)	ND (56)	ND (51)	ND (53)	ND (54)	ND (47)	10,000,000	10,000,000	1,600,000
Naphthalene	ND (45)	ND (56)	ND (51)	ND (53)	ND (54)	ND (47)	56,000,000	190,000,000	25,000
SVOCs									
Anthracene	ND (37)	ND (39)	ND (39)	ND (41)	ND (41)	ND (39)	190,000,000	190,000,000	350,000
Benzo(a)anthracene	200	46 J	ND (39)	58 J	ND (41)	44 J	110,000	190,000,000	320,000
Benzo(a)pyrene	ND (37)	60 J	ND (39)	49 J	50 J	58 J	11,000	190,000,000	46,000
Benzo(b)fluoranthene	ND (37)	42 J	ND (39)	47 J	61 J	57 J	110,000	190,000,000	170,000
Benzo(ghi)perylene	ND (37)	65 J	57 J	ND (41)	53 J	78 J	170,000,000	190,000,000	180,000
Chrysene	150 J	140 J	ND (39)	87 J	51 J	64 J	11,000,000	190,000,000	230,000
Fluorene	69 J	ND (39)	ND (39)	ND (41)	ND (41)	ND (39)	110,000,000	190,000,000	3,800,000
Indeno(1,2,3-cd)pyrene	ND (37)	ND (39)	52 J	ND (41)	ND (41)	42 J	110,000	190,000,000	28,000,000
Phenanthrene	103 J	58 J	ND (39)	59 J	ND (41)	ND (39)	190,000,000	190,000,000	10,000,000
Pyrene	110 J	100 J	54 J	98 J	81 J	82 J	84,000,000	190,000,000	2,200,000

NOTES:

All soil samples collected at approximately 6" below grade.
All results in ug/kg (micrograms per kilogram)
ND (23) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

P:\Clients\Sunoco\AST Investigations\AST 881\[ast 881 soil results 2005.xls]881

APPENDIX A

Laboratory Analytical Report

ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

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

SAMPLE GROUP

The sample group for this submittal is 965084. Samples arrived at the laboratory on Thursday, Oct 27 2005.
The project for this group is AST 881.
The PO# for this sample group is SUNOCO: AST 881.

Sample Nc	Collected	Client Description
4634610	10/26/05 13:00	881-1 Grab Soil Sample SUNOCO: AST 881
4634611	10/26/05 13:10	881-2 Grab Soil Sample SUNOCO: AST 881
4634612	10/26/05 13:15	881-3 Grab Soil Sample SUNOCO: AST 881
4634613	10/26/05 13:20	881-4 Grab Soil Sample SUNOCO: AST 881
4634614	10/26/05 13:30	881-5 Grab Soil Sample SUNOCO: AST 881
4634615	10/26/05 13:40	881-6 Grab Soil Sample SUNOCO: AST 881
4634616		MEOH Trip Blank Sample SUNOCO: AST 881
4634617		Trip Blank Water Sample SUNOCO: AST 881

1 COPY TO Secor International, Inc. Attn: Sergio Morescalchi

Questions? Contact your Client Services Representative
Sandra L Patton at (717)656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

ANALYTICAL RESULTS

Prepared for:

Secor International, Inc.
102 Pickering Way
Suite 200
Exton PA 19341
484-875-3075

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

Lancaster Laboratories

Analytical Report

Secor International, Inc.
Project: SUNOCO: AST 881
SDG:

Report Date: 11/9/2005 12:57
Submit Date: 10/27/2005 17:20

Analysis Name	Units	4634616 MEOH Tri Result	MDL
Benzene	ug/kg	N.D.	25.
Toluene	ug/kg	N.D.	50.
Ethylbenzene	ug/kg	N.D.	50.
Isopropylbenzene	ug/kg	N.D.	50.
Naphthalene	ug/kg	N.D.	50.

Analysis Name	Units	4634610 881-1 Gr Result	MDL	4634611 881-2 Gr Result	MDL	4634612 881-3 Gr Result	MDL
Moisture	%	9.4	0.50	14.6	0.50	14.6	0.50
Pyrene	ug/kg	110. J	37.	100. J	39.	54. J	39.
Fluorene	ug/kg	69. J	37.	N.D.	39.	N.D.	39.
Phenanthrene	ug/kg	130. J	37.	58. J	39.	N.D.	39.
Anthracene	ug/kg	N.D.	37.	N.D.	39.	N.D.	39.
Benzo(a)anthracene	ug/kg	200.	37.	46. J	39.	N.D.	39.
Chrysene	ug/kg	150. J	37.	140. J	39.	N.D.	39.
Benzo(b)fluoranthene	ug/kg	N.D.	37.	42. J	39.	N.D.	39.
Benzo(a)pyrene	ug/kg	N.D.	37.	60. J	39.	N.D.	39.
Indeno(1,2,3-cd)pyrene	ug/kg	N.D.	37.	N.D.	39.	52. J	39.
Benzo(g,h,i)perylene	ug/kg	N.D.	37.	65. J	39.	57. J	39.
Benzene	ug/kg	N.D.	23.	N.D.	28.	N.D.	25.
Toluene	ug/kg	N.D.	45.	N.D.	56.	N.D.	51.
Ethylbenzene	ug/kg	N.D.	45.	N.D.	56.	N.D.	51.
Isopropylbenzene	ug/kg	N.D.	45.	N.D.	56.	N.D.	51.
Naphthalene	ug/kg	N.D.	45.	N.D.	56.	N.D.	51.

Analysis Name	Units	4634613 881-4 Gr Result	MDL	4634614 881-5 Gr Result	MDL	4634615 881-6 Gr Result	MDL
Moisture	%	18.7	0.50	18.0	0.50	14.9	0.50
Pyrene	ug/kg	98. J	41.	81. J	41.	82. J	39.
Fluorene	ug/kg	N.D.	41.	N.D.	41.	N.D.	39.
Phenanthrene	ug/kg	59. J	41.	N.D.	41.	N.D.	39.
Anthracene	ug/kg	N.D.	41.	N.D.	41.	N.D.	39.
Benzo(a)anthracene	ug/kg	58. J	41.	N.D.	41.	44. J	39.
Chrysene	ug/kg	87. J	41.	51. J	41.	64. J	39.
Benzo(b)fluoranthene	ug/kg	47. J	41.	61. J	41.	57. J	39.
Benzo(a)pyrene	ug/kg	49. J	41.	50. J	41.	58. J	39.
Indeno(1,2,3-cd)pyrene	ug/kg	N.D.	41.	N.D.	41.	42. J	39.
Benzo(g,h,i)perylene	ug/kg	N.D.	41.	53. J	41.	78. J	39.
Benzene	ug/kg	N.D.	27.	N.D.	27.	N.D.	24.
Toluene	ug/kg	N.D.	53.	N.D.	54.	N.D.	47.
Ethylbenzene	ug/kg	N.D.	53.	N.D.	54.	N.D.	47.
Isopropylbenzene	ug/kg	N.D.	53.	N.D.	54.	N.D.	47.
Naphthalene	ug/kg	N.D.	53.	N.D.	54.	N.D.	47.

Lancaster Laboratories

Analytical Report

Secor International, Inc.
Project: SUNOCO: AST 881
SDG:

Report Date: 11/9/2005 12:57
Submit Date: 10/27/2005 17:20

Analysis Name	Units	4634617 Trip Bla Result	MDL
Benzene	ug/l	N.D.	0.5
Toluene	ug/l	N.D.	0.7
Ethylbenzene	ug/l	N.D.	0.8
Isopropylbenzene	ug/l	N.D.	1.
Naphthalene	ug/l	N.D.	1.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial ID	Analysis Date/Time	Analyst	Dilution
4634610	**881-1 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0553	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0344	Lauren C Marzario	41.19
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1345	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634611	**881-2 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0615	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0407	Lauren C Marzario	47.89
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1346	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634612	**881-3 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0636	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0430	Lauren C Marzario	43.55
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1348	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634613	**881-4 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0658	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0453	Lauren C Marzario	43.25
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1349	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634614	**881-5 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0720	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0516	Lauren C Marzario	44.25
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1350	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634615	**881-6 Grab Soil Sample**					
00111	Moisture	EPA 160.3 modified	1	10/28/05 1801	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	11/2/05 0741	Linda M Hartenstine	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0539	Lauren C Marzario	40
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1351	Larry E Bevins	1
07806	BNA Soil Extraction	SW-846 3550B	1	11/1/05 0410	David V Hershey Jr	1
4634616	**MEOH Trip Blank Sample**					
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	10/29/05 0602	Lauren C Marzario	50
06171	GC/MS - Field Preserved MeOH	SW-846 5035	1	10/28/05 1352	Larry E Bevins	1
4634617	**Trip Blank Water Sample**					
02300	UST-Unleaded Waters by 8260B	SW-846 8260B	1	11/3/05 1756	Gordon A Lodde	1
01163	GC/MS VOA Water Prep	SW-846 5030B	1	11/3/05 1756	Gordon A Lodde	n.a.

Quality Control Summary

Client Name: Secor International, Inc. Group Number: 965084

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	Max RPD
Batch number: 05301820003A	Sample number(s): 4634610-4634615							
Moisture				99		99-101		
Batch number: 05304SLJ026	Sample number(s): 4634610-4634615							
Pyrene	N.D.	33.	ug/kg	90		67-116		
Fluorene	N.D.	33.	ug/kg	86		66-115		
Phenanthrene	N.D.	33.	ug/kg	92		70-107		
Anthracene	N.D.	33.	ug/kg	90		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	91		73-111		
Chrysene	N.D.	33.	ug/kg	92		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	81		68-117		
Benzo(a)pyrene	N.D.	33.	ug/kg	86		72-117		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	86		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	86		66-120		
Batch number: P053072AA	Sample number(s): 4634617							
Benzene	N.D.	0.5	ug/l	91	96	85-117	6	30
Toluene	N.D.	0.7	ug/l	93	96	85-115	4	30
Ethylbenzene	N.D.	0.8	ug/l	94	98	82-119	5	30
Isopropylbenzene	N.D.	1.	ug/l	92	97	80-120	5	30
Naphthalene	N.D.	1.	ug/l	90	91	61-116	1	30
Batch number: Q053011AA	Sample number(s): 4634610-4634616							
Benzene	N.D.	25.	ug/kg	86	91	77-119	5	30
Toluene	N.D.	50.	ug/kg	93	101	81-116	8	30
Ethylbenzene	N.D.	50.	ug/kg	91	98	82-115	7	30
Isopropylbenzene	N.D.	50.	ug/kg	85	92	79-117	8	30
Naphthalene	N.D.	50.	ug/kg	73	87	52-121	17	30

Sample Matrix Quality Control

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max

* - 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.

Quality Control Summary

Batch number: 05301820003A	Sample number(s): 4634610-4634615				
Moisture			22.0	20.6	6	15
Batch number: 05304SLJ026	Sample number(s): 4634610-4634615				
Pyrene	187*	222*	25-159	10	30
Fluorene	99	86	48-130	7	30
Phenanthrene	299*	247*	28-155	8	30
Anthracene	101	97	47-135	3	30
Benzo(a)anthracene	86	105	39-144	12	30
Chrysene	108	121	38-144	7	30
Benzo(b)fluoranthene	81	74	24-155	7	30
Benzo(a)pyrene	93	85	38-142	6	30
Indeno(1,2,3-cd)pyrene	107	97	1-186	9	30
Benzo(g,h,i)perylene	121	108	32-150	10	30
Batch number: P053072AA	Sample number(s): 4634617				
Benzene	99		83-128		
Toluene	97		83-127		
Ethylbenzene	99		82-129		
Isopropylbenzene	98		81-130		
Naphthalene	91		50-124		

Surrogate Quality Control

Analysis Name: PAHs in Soil by GC/MS
Batch number: 05304SLJ026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4634610	88	103	105
4634611	99	107	121
4634612	85	100	114
4634613	86	94	116
4634614	86	94	116
4634615	87	97	121
Blank	90	94	100
LCS	84	92	94
MS	95	110	90
MSD	94	105	107
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.

Quality Control Summary

Analysis Name: UST-Unleaded Waters by 8260B
Batch number: P053072AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4634617	91	94	95	91
Blank	91	93	96	94
LCS	90	93	96	96
LCSD	92	93	96	96
MS	92	93	95	92
Limits:	80-116	77-113	80-113	78-113

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q053011AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4634610	83	82	84	81
4634611	85	84	88	83
4634612	84	82	85	81
4634613	78	75	80	73
4634614	86	84	88	82
4634615	80	78	82	75
4634616	93	91	96	89
Blank	95	96	97	94
LCS	95	93	99	96
LCSD	100	97	106	102
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.

Comments

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.

4634610 881-1 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
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.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634611 881-2 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.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634612 881-3 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

Comments

are from the initial injection of the sample.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634613 881-4 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.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634614 881-5 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
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.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634615 881-6 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

Comments

are from the initial injection of the sample.

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634616 MEOH Trip Blank Sample

02304 UST-Unleaded Soils by 8260B
The analysis for volatiles was performed on a sample which was preserved in methanol. The reporting limits were adjusted appropriately.

Commonwealth of Pennsylvania Lab Certification No. 36-037

4634617 Trip Blank Water Sample

Commonwealth of Pennsylvania Lab Certification No. 36-037

Lancaster Laboratories
2425 New Holland Pike • Lancaster, PA 17601

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
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
ug	microgram(s)	**mg**	milligram(s)
ml	milliliter(s)	**l**	liter(s)
m3	cubic meter(s)	**ul**	microliter(s)

< 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

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

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. All other results are reported on an as-received basis.

U.S. EPA CLP 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 quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
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 sample 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.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions of Lancaster Laboratories and we hereby object to any conflicting terms contained in any acceptance or order submitted by client.

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
February 26, 2008

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

RECEIVED
FEB 29 2008
By

Mr. Scott A. Baker, P.E.
Sunoco, Inc.
3144 Passyunk Avenue
Philadelphia, PA 19145

Re: Storage Tank Program
Facility ID No. 51-36558 & 51-19781
Sunoco Girard Point & Point Breeze Facilities
3144 Passyunk Avenue
Philadelphia County

Dear Mr. Baker:

Over the past few years, we have received documents from you that mention how Sunoco considers certain regulated storage tank release incidents to be covered by the 2003 Consent Order & Agreement (CO&A) between the Department and Sunoco, Inc. The purpose of this letter is to clarify for you which release incidents at the two above-mentioned facilities are covered under the 2003 CO&A. Paragraph 8 of the CO&A states that release incidents associated with a closure or change-in-service of an aboveground storage tank (AST) are covered by the CO&A. Thus, incidents not involving a tank closure or change-in-service are not covered.

All incidents occurring at these two facilities in the past few years (since we have been actively tracking regulated storage tank releases) are listed in the two tables below. There are multiple incidents that have occurred at these two facilities prior to our tracking of releases, which are not listed in the tables below and were not adequately addressed. Please be sure to address those releases incidents as well in accordance with either the CO&A or the corrective action process detailed in the storage tank regulations (25 Pa. Code Chapter 245 Subchapter D).

Please note that the CO&A does state that corrective actions required by Chapter 245 Sections 304, 305, 306, and 307 must still be completed for any AST closure and change-in-service.

Release incidents covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	1002	139A	4-7-06
Girard Point	1100	140A	5-31-06
Girard Point	277	039A	6-25-07
Girard Point	1208	025A	6-28-07
Point Breeze	119	024A	4-7-06
Point Breeze	182	048A	5-31-06
Point Breeze	181	047A	6-22-07
Point Breeze	848	116A	6-25-07
Point Breeze	252	055A	6-28-07

Release incidents NOT covered by 2003 CO&A

Facility	Sunoco Tank No.	PADEP Tank No.	Confirmed Release Date
Girard Point	250	030A	1-27-07
Girard Point	T-201	175A	12-10-07
Girard Point	1088	089A	12-31-07
Point Breeze	881	120A	9-3-05
Point Breeze	140	031A	9-15-05
Point Breeze	847	115A	9-3-06
Point Breeze	885	124A	10-15-06

The Department realizes that several corrective action reports have been submitted for some of the above-listed incidents which are not covered by the CO&A. We will issue a response for those reports. All incidents covered by the CO&A will be "administratively closed out" on our eFACTS database with a comment stating that the release will be addressed under the CO&A.

This letter is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

Sincerely,

Heidi J. Kunsch
Water Quality Specialist
Environmental Cleanup

cc: Philadelphia Health Department
Mr. Higgins, Philadelphia L&I
Mr. Stan Sneath, PADEP
Mr. Steve O'Neil, PADEP
Mr. Ayman Ghobrial, PADEP
Re

PB 885

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
May 4, 2007

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

Mr. Ron Rosendorn
Sunoco, Inc. R&M
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

RECEIVED
MAY 0 8 2007
By RR

Re: Storage Tank Program
Sunoco, Inc. Point Breeze Process Area
Tank 885
Facility ID No. 51-19781
Point Breeze Process Area
City of Philadelphia
Philadelphia County

Dear Mr. Rosendorn:

On April 16, 2007 we received your report entitled "Site Characterization Report", dated April 12, 2007, for the storage tank facility referenced above. We consider this submittal to be the Remedial Action Completion Report required by the Corrective Action Process regulations, 25 Pa. Code Section 245.313.

You have identified your selected cleanup standard as either the Department's Statewide Health Standard or Background Standard. As such, the Department will attempt to review this report within 60 days of its receipt and send a review letter to the facility owner.

If you have any questions concerning the requirements of the Corrective Action Process regulations, please contact me at 484-250-5703.

Sincerely,

Thomas D. Canigiani, Jr.
Water Quality Specialist Supervisor
Environmental Cleanup

cc: Philadelphia County Health Department
City of Philadelphia
Mr. Miceli, USTIF
Mr. Baker (Sunoco Env. Department)
Mr. Payne
Re 30 (RW07ECP) 124-2

PB 885

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401
October 17, 2006

Southeast Regional Office

Phone: 484-250-5960
Fax: 484-250-5961

NOTICE OF VIOLATION

Mr. Ron Rosendorn
Sunoco, Inc. R&M
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

RECEIVED
OCT 19 2006
By RR

Re: Storage Tank Program
Facility ID No. 51-19781
Point Breeze Process Area
City of Philadelphia
Philadelphia County

Dear Mr. Rosendorn:

On October 15, 2006, a reportable release of crude oil was confirmed at your above-named facility. This release constitutes a violation of Section 1310 of the Pennsylvania Storage Tank and Spill Prevention Act. Our purpose in sending you this notice is to advise you of your regulatory responsibility and to provide guidance and details to help you address this release quickly and effectively under the Department's corrective action regulations (Title 25, Chapter 245, subchapter D).

In order to ensure the release is addressed in a prompt and appropriate manner, you should provide a progress report to this office no later than January 13, 2007. A copy is enclosed for your use. Your site characterization report is due April 13, 2007. No extension of the site characterization report due date will be provided without prior written approval from the Department. All requests for deadline extensions shall be submitted via email or regular mail. The request should include a valid, technical reason for the extension as well as a revised SCR submittal date.

Please note that we intend to initiate a compliance action if you fail to comply with the regulations. We encourage you to proceed without delay to hire a qualified environmental consulting firm that has a Registered Professional Geologist on staff that can assist you in accomplishing the requirements outlined below.

1. INTERIM REMEDIAL ACTIONS

Effective interim actions may resolve a problem or reduce the severity of a problem making site cleanup easier and less expensive. Some typical interim actions are listed on the attached *90 Day Site Characterization Status Report* form.

If your release does affect or diminish a private or public water supply, you must provide a temporary water supply for affected users within 48 hours. Within 90 days, a permanent water supply must be in place. Treatment to remove or prevent contamination of a public water supply may require a permit from the Department. We recommend that you contact the regional Water Supply Management Program (WSM) at 484-250-5980 prior to any planned treatment installations on a public source. If you are unsure if a well is classified as a public water source, WSM can advise you.

The regulations require that within 15 days of the release you provide written notification of the release to the municipality where the release occurred and to each municipality that has been impacted. We recommend that you establish an open dialogue to insure the appropriate municipal officials remain informed of site activities.

2. CORRECTIVE ACTION ACTIVITIES AND REPORTS

After a release has been confirmed, other corrective actions are required in addition to the interim remedial actions listed on the *90 Day Site Characterization Status Report* form. Some of these requirements include fieldwork and report submission under the site characterization (which is required to identify your chosen cleanup standard), remedial action, and the remedial action completion report phases. In addition, the regulations specify time frames for conducting this work that must be followed.

If, in addition to your current release, you have had releases in the past, we request that these historic releases also be addressed in your current reports. If the past releases have been successfully remediated they should still be discussed in the narrative section of your site characterization report.

To discharge any treated groundwater you must have a General Permit (GP-5, Discharges from Petroleum Product Contaminated Groundwater Remediation Systems). Questions concerning General Permit approvals should be directed to our Water Management Program at 484-250-5970.

3. DOCUMENTS

Many of the documents mentioned in this letter can be found on the Department's website (www.depweb.state.pa.us) or by contacting our Regional Office at 484-250-5960.

Please feel free to contact Mr. Walter Payne by calling 484-250-5960 with any questions related to this letter. All reports referenced in this letter are to be submitted to:

Kathy Nagle, Storage Tank Section
PA DEP Southeast Region
2 E. Main Street
Norristown, PA 19401

This Notice of Violation is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

Sincerely,

Kathy J. Nagle
Chief, Storage Tank Section
Environmental Cleanup

Enclosure

cc: Philadelphia County Health Department
Mr. John Higgins, Philadelphia L & I
Mr. Kevin Gallagher
Mr. Walter Payne
Re 30

COPY

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

Certified Mail Return Receipt Requested - # 7002 0460 0003 1936 7431

April 12, 2007

Ms. Kathy Nagle
PA DEP – S. E. Region
2 East Main Street
Norristown, PA 19401

RE: Site Characterization/Assessment Report - PA Tank Regulation 245.310
Storage Tank PB 885 (PA Reg #124A)
Sunoco, Inc. – Point Breeze Process Area (Facility ID# 51-19781)

Dear Ms. Nagle:

In response to your Notice of Violation Letter of October 17, 2006 (copy enclosed), enclosed is a site characterization/assessment report for a reportable release that occurred on October 15, 2006. This report contains information specified at 245.310(b).

Should you have any questions or comments in reference to this matter please contact me at 215-339-2074.

Sincerely,

Scott A. Baker
Supervisor, Environmental Department.

SAB/rmr

Attachments: PADEP Notice of Violation Letter of October 17, 2006
Site Assessment/Characterization Report PB 885

File: Release Report PA Tank Law 2006

SECOR

SECOR
INTERNATIONAL
INCORPORATED

www.secor.com
102 Pickering Way, Suite 200
Exton, PA 19341
484-875-3075 TEL
484-875-9286 FAX

April 9, 2007

Ron Rosendorn
Senior Environmental Engineer Specialist
SUNOCO (R&S)
3144 Passyunk Avenue
Philadelphia, Pennsylvania

RE: Tank 885 Soil Sampling
Philadelphia Refinery

Dear Mr. Rosendorn:

This letter summarizes the site assessment activities in response to a release of crude oil within the dike area for tank PB 885. The project site is located within the Sunoco, Inc. (Sunoco) Philadelphia Refinery located in Philadelphia, Pennsylvania (**Figure 1**). As a result of the release, interim remedial activities were conducted by Sunoco, including the removal of surface soils. Site assessment activities were conducted after the removal of surface soil to determine whether additional interim remedial actions are necessary to abate an imminent hazard to human health or the environment.

The following information supplements the AOI 4 Site Characterization Report submitted by Langan on August 29, 2005.

Soil Sampling and Laboratory Analyses

SECOR collected a total of 27 soil samples during two sampling events, November 30, 2006 and March 14, 2007. Soil sample locations are depicted on **Figure 2** and **Figure 3**, respectively. All soil samples were collected at a depth of approximately 0-6 inches below ground surface. During the November 2006 sampling event a total of twelve soil samples were collected (AST-885-SS-1 through AST-885-SS-10, AST-884-SS-1 and AST-884-SS-2) and an additional fifteen soils samples were collected in March 2007 (AST-885-CS-1 through AST-885-CS-15).

The laboratory analyses selected for the soil samples were based on the material released. As a result, the soil samples were analyzed for Pennsylvania Department of Environmental Protection (PADEP) Pennsylvania Land Recycling Program (Act 2) short list of parameters for fuel oil 4, 5, 6 and waste oil in soils plus total xylenes. The list includes the analyses of benzene, toluene, ethylbenzene, total xylenes (BTEX),

naphthalene, and isopropylbenzene by EPA Method 8260B, pyrene, fluorene, phenanthrene, anthracene, benzo(a)anthracene, chysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene by EPA Method 8270C, and lead by EPA Method 6010B.

Soil Sampling Results

The soil analytical data are summarized on **Table 1** and **Table 2**. Copies of the laboratory analytical results are included in **Appendix A.** The analytical results for the soil samples were compared to the cleanup criteria established by PADEP under Act 2. Under the regulations implementing Act 2, Medium Specific Concentrations (MSCs) for soils include two components. PADEP has developed MSCs for soils based on direct contact exposure scenarios and those which are designed to protect groundwater. Soil sample results were compared to the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs. These MSCs are listed in Appendix A, Tables 3A and 3B and Tables 4A and 4B (revised November 24, 2001) of the Act 2 Rules and Regulations.

A preliminary set of soil samples were collected in November 2006 (**Table 1**) to determine if interim remedial activities were effective. No soil samples exceeded the Nonresidential Surface Soil Direct Contact MSCs or the Nonresidential Subsurface Soil Direct Contact MSCs. With the exception of benzene in AST-885-SS-6, no soil samples exceeded the Used Aquifer Nonresidential Soil-to-Groundwater MSCs. Benzene was detected above the Used Aquifer Nonresidential Soil-to-Groundwater MSC of 500 ug/kg in AST-885-SS-6 at 2,600 ug/kg. However, despite the exceedance of criteria, this result appears to be anomalous since all other samples were below the target MSCs. Interim remedial activities were therefore deemed effective. Utilizing the statistical soil sampling protocol, additional soil samples were collected in March 2007 to verify that the soil removal activities were complete. A total of fifteen soils sample locations were randomly selected fulfilling the required minimum of twelve soil samples per each 3,000 cubic yards. All fifteen soil samples met the Nonresidential Surface Soil and Subsurface Soil Direct Contact MSCs and Used Aquifer Nonresidential Soil-to-Groundwater MSCs with the exception of AST-885-CS-2, which benzene was detected at a concentration of 550 ug/kg slightly above the MSC of 500 ug/kg.

Conclusions

Soil attainment has been demonstrated since greater then seventy five percent of the soil sample results are less than the Nonresidential Surface Soil and Subsurface Soil Direct Contact and Used Aquifer Nonresidential Soil-to-Groundwater MSCs and no individual sample exceeded ten times the standard. No further remedial activities are

found necessary; the interim remedial activities completed have effectively removed imminent hazard to human health or the environment.

Should you have any questions or comments, please feel free to contact either of us at (484) 875-3075.

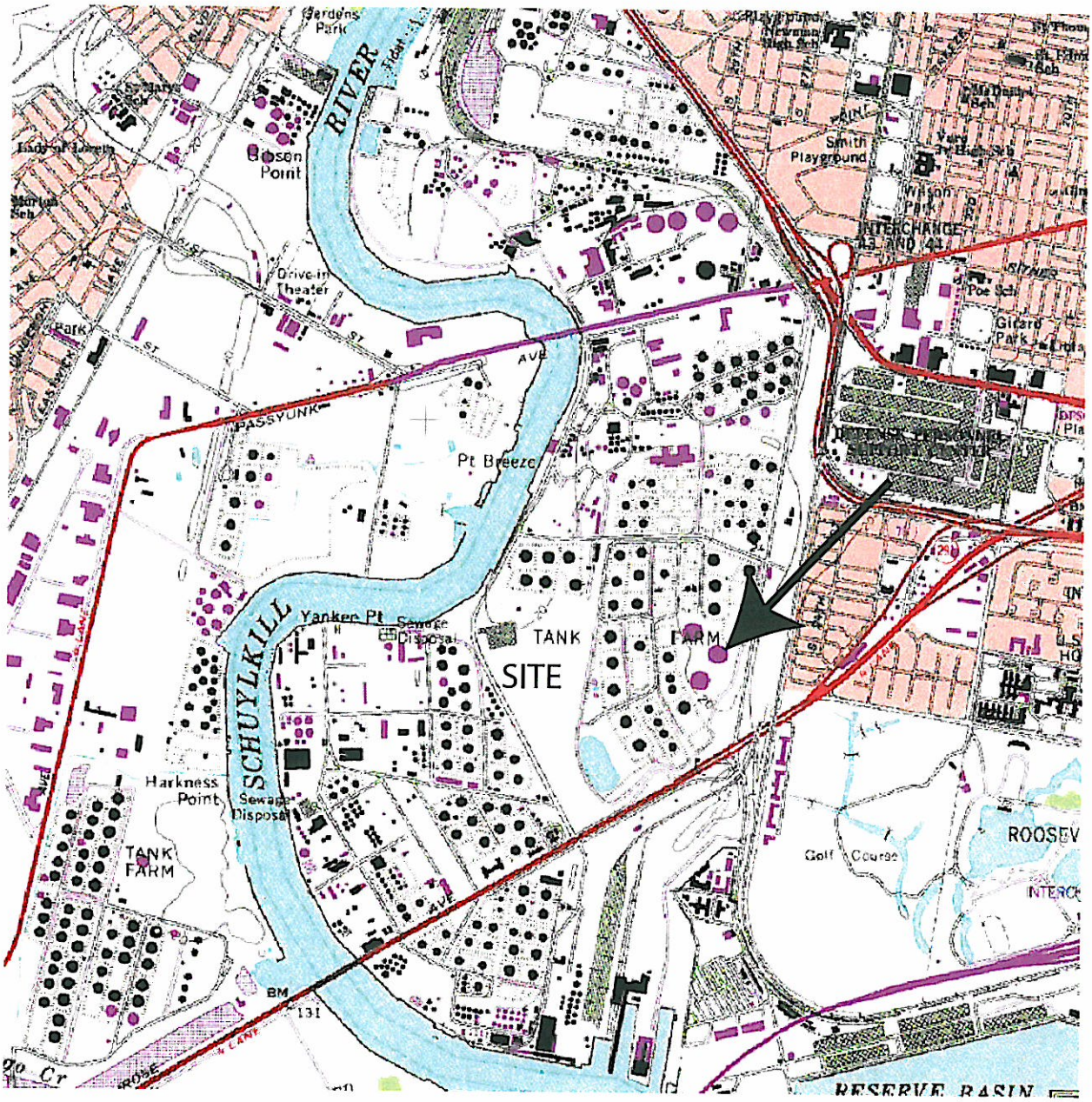
Sincerely,
SECOR International Incorporated

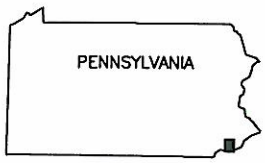
Casey Yetman
Project Manager

Frank Aceto, PG
Principal Hydrogeologist

Cc: Jim Oppenheim (Sunoco)
Project File

FIGURES





QUADRANGLE LOCATION

N

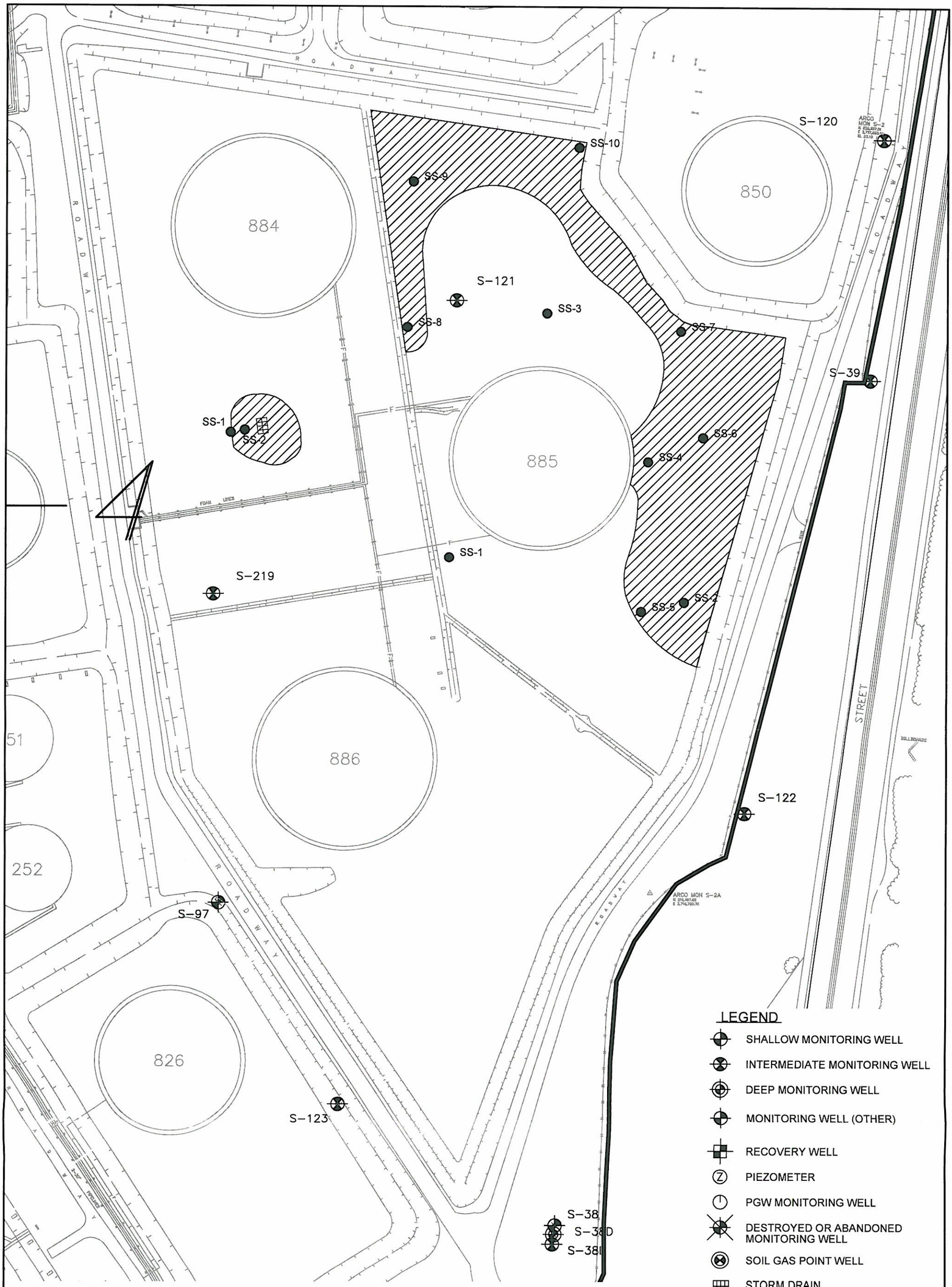
0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PENNSYLVANIA–NEW JERSEY; 1995

SECOR
102 PICKERING WAY, SUITE 200
EXTON, PENNSYLVANIA
PHONE: (484) 875-3075/875-8286 (FAX)

FOR:		SITE LOCATION MAP PHILADELPHIA REFINERY		FIGURE: 1
SUNOCO, INC. PHILADELPHIA REFINERY PHILADELPHIA, PENNSYLVANIA				
JOB NUMBER: 62SU.01095	DRAWN BY: KEF	CHECKED BY: CY	APPROVED BY:	DATE: 04/17/2006



N

0 100 200

APPROXIMATE SCALE IN FEET

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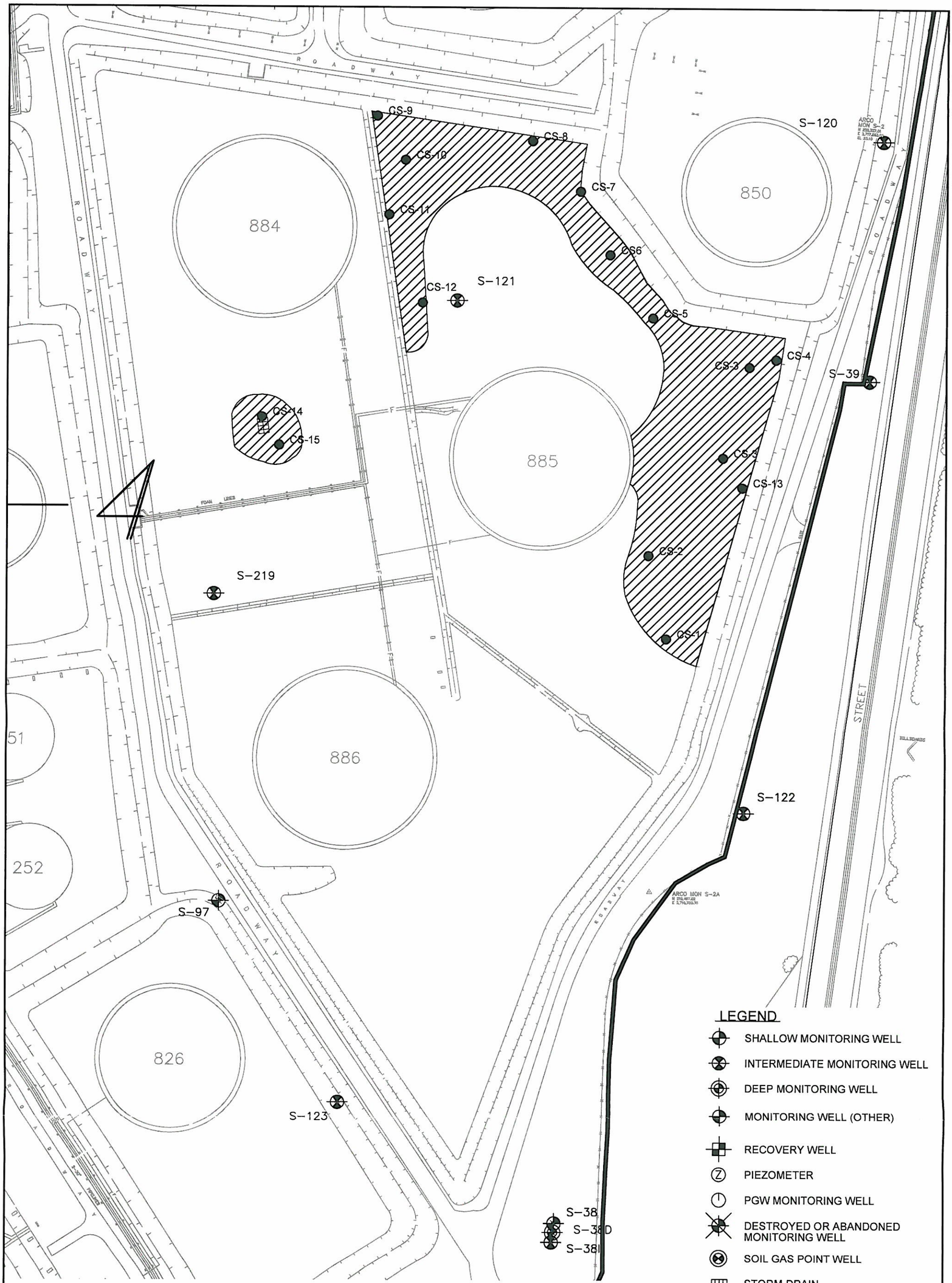
SECOR
57 Lafayette Circle, 2nd Floor
Lafayette, CA
PHONE: (925) 299-9300 FAX: (925) 299-9302

FOR:
SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

NOVEMBER 2006
SOIL SAMPLE
MAP

FIGURE:
2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:



LEGEND

- SHALLOW MONITORING WELL
- INTERMEDIATE MONITORING WELL
- DEEP MONITORING WELL
- MONITORING WELL (OTHER)
- RECOVERY WELL
- PIEZOMETER
- PGW MONITORING WELL
- DESTROYED OR ABANDONED MONITORING WELL
- SOIL GAS POINT WELL
- STORM DRAIN
- RELEASE IMPACTED AREA

N

0 100 200

APPROXIMATE SCALE IN FEET

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SECOR
57 Lafayette Circle, 2nd Floor
Lafayette, CA
PHONE: (925) 299-9300 FAX: (925) 299-9302

FOR:
SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

MARCH 2007
SOIL SAMPLE
MAP

FIGURE:
3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:

TABLES

Table 1
AST PB 885 Soil Analytical Results
Sunoco Philadelphia Refinery

Sample Identification	MSCs			AST-885-SS-1	AST-885-SS-2	AST-885-SS-3	AST-885-SS-4	AST-885-SS-5	AST-885-SS-6	AST-885-SS-7	AST-885-SS-8	AST-885-SS-9	AST-885-SS-10	AST-884-SS-1	AST-884-SS-2
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Collection Date				11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006	11/30/2006
VOCs															
Benzene	210,000	240,000	500	ND (28)	100 J	ND (33)	68 J	350	**2,600**	160 J	ND (35)	ND (29)	110 J	ND (31)	55 J
Toluene	10,000,000	10,000,000	100,000	ND (57)	1,600	ND (65)	100 J	3,300	26,000	3,400	ND (69)	ND (59)	850	120	ND (59)
Ethylbenzene	10,000,000	10,000,000	70,000	ND (57)	2,100	ND (65)	ND (52)	3,400	13,000	2,400	ND (69)	ND (59)	2,200	740	ND (59)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (57)	1,200	ND (65)	ND (52)	1,700	5,400	2,900	ND (69)	110 J	1,200	490	ND (59)
Naphthalene	56,000,000	190,000,000	25,000	ND (57)	4,800	ND (65)	110 J	5,600	15,000	11,000	ND (69)	550	6,500	2,700	ND (59)
Total Xylenes	140,000	190,000	1,000,000	ND (57)	21,000	ND (65)	4,400	27,000	97,000	66,000	ND (69)	1,800	17,000	6,400	ND (59)
SVOCs															
Anthracene	190,000,000	190,000,000	350,000	ND (180)	ND (200)	ND (38)	ND (180)	ND (200)	ND (200)	ND (200)	ND (200)	200 J	ND (210)	45 J	ND (40)
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (180)	ND (200)	76 J	ND (180)	ND (200)	ND (200)	220 J	ND (200)	490 J	ND (210)	73 J	140 J
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (180)	ND (200)	69 J	ND (180)	ND (200)	ND (200)	ND (200)	220 J	360 J	ND (210)	81 J	140 J
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (180)	ND (200)	75 J	ND (180)	ND (200)	ND (200)	ND (200)	240 J	460 J	ND (210)	88 J	150 J
Benzo(g,h,i)perylene	170,000,000	190,000,000	180,000	ND (180)	ND (200)	46 J	ND (180)	ND (200)	ND (200)	ND (200)	ND (200)	260 J	ND (210)	58 J	96 J
Chrysene	11,000,000	190,000,000	230,000	ND (180)	ND (200)	77 J	ND (180)	ND (200)	ND (200)	220 J	ND (200)	550 J	ND (210)	100 J	150 J
Fluorene	110,000,000	190,000,000	3,800,000	ND (180)	ND (200)	ND (38)	ND (180)	ND (200)	1,200	1,200	ND (200)	470 J	1,200	390	ND (40)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (180)	ND (200)	46 J	ND (180)	ND (200)	ND (200)	ND (200)	ND (200)	300 J	ND (210)	47 J	100 J
Phenanthrene	190,000,000	190,000,000	10,000,000	ND (180)	880 J	120 J	500 J	1,500	2,000	2,300	ND (200)	1,400	2,000	660	170 J
Pyrene	84,000,000	190,000,000	2,200,000	180 J	ND (200)	92 J	ND (180)	ND (200)	ND (200)	ND (200)	240 J	820 J	ND (210)	390	240

Notes:
FBG = Feet Below Grade
All concentrations are in ug/kg (micrograms per kilogram)
ND (30) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

Table 2
AST PB 885 Soil Analytical Results
Sunoco Philadelphia Refinery

Sample Identification	MSCs			AST-885-CS-1	AST-885-CS-2	AST-885-CS-3	AST-885-CS-4	AST-885-CS-5	AST-885-CS-6	AST-885-CS-7	AST-885-CS-8	AST-885-CS-9	AST-885-CS-10	AST-885-CS-11	AST-885-CS-12	AST-885-CS-13	AST-885-CS-14	AST-885-CS-15
Sample Collection Depth (FBG)	Direct Contact, Non-residential, 0-2 feet (1)	Direct Contact, Non-residential, 2-15 feet (1)	Soil to Groundwater, Used Aquifer, Non-residential (2)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Collection Date				3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007	3/14/2007
VOCs																		
Benzene	210,000	240,000	500	ND (96)	**550**	ND (90)	190	110	ND (92)	ND (100)	ND (110)	ND (110)	ND (90)	ND (95)	ND (94)	ND (94)	ND (89)	ND (96)
Toluene	10,000,000	10,000,000	100,000	ND (96)	1,100	610	3,400	3,300	ND (92)	230	ND (110)	ND (110)	ND (90)	ND (95)	160	ND (94)	ND (89)	ND (96)
Ethylbenzene	10,000,000	10,000,000	70,000	110	1,600	440	1,700	1,800	ND (92)	510	340	ND (110)	ND (90)	ND (95)	ND (94)	ND (94)	ND (89)	ND (96)
Isopropylbenzene	10,000,000	10,000,000	1,600,000	ND (96)	440	480	1,100	1,100	ND (92)	350	250	ND (110)	99	ND (95)	ND (94)	ND (94)	ND (89)	ND (96)
Naphthalene	56,000,000	190,000,000	25,000	520	1,400	4,100	4,600	4,300	190	1,200	740	210	100	ND (95)	ND (94)	480	ND (89)	ND (96)
Total Xylenes	140,000	190,000	1,000,000	2,100	7,900	18,000	21,000	22,000	810	7,300	3,100	1,000	150	ND (95)	ND (94)	1,900	ND (89)	ND (96)
SVOCs																		
Anthracene	190,000,000	190,000,000	350,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	450
Benzo(a)anthracene	110,000	190,000,000	320,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	760
Benzo(a)pyrene	11,000	190,000,000	46,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	460
Benzo(b)fluoranthene	110,000	190,000,000	170,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	680
Benzo(g,h,i)perylene	170,000,000	190,000,000	180,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	ND (400)
Chrysene	11,000,000	190,000,000	230,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	560
Fluorene	110,000,000	190,000,000	3,800,000	ND (390)	490	3,300	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	ND (400)
Indeno(1,2,3-cd)pyrene	110,000	190,000,000	28,000,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	ND (400)
Phenanthrene	190,000,000	190,000,000	10,000,000	600	610	3,900	ND (380)	2,500	720	ND (410)	1,900	1,200	ND (400)	ND (410)	500	1,200	ND (430)	1,600
Pyrene	84,000,000	190,000,000	2,200,000	ND (390)	ND (410)	ND (380)	ND (380)	ND (380)	ND (420)	ND (410)	ND (450)	ND (450)	ND (400)	ND (410)	ND (380)	ND (380)	ND (430)	1,100

Notes:
FBG = Feet Below Grade
All concentrations are in ug/kg (micrograms per kilogram)
ND (30) = Not detected at or above the laboratory reporting limit
J = Estimated value
MSCs = Medium-Specific Concentrations
(1)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 A (Revised November 24, 2001)
(2)= Pennsylvania Land Recycling Program (25 PA code Chapter 250), Appendix A, Table 3 B (Revised November 24, 2001)

APPENDIX A

Lancaster Laboratories

ANALYTICAL RESULTS

Prepared for:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1016432. Samples arrived at the laboratory on Saturday, December 02, 2006.

Client Description			Lancaster Labs Number
AST-885-SS-1	Grab	Soil	4929243
AST-885-SS-2	Grab	Soil	4929244
AST-885-SS-3	Grab	Soil	4929245
AST-885-SS-4	Grab	Soil	4929246
AST-885-SS-5	Grab	Soil	4929247
AST-885-SS-6	Grab	Soil	4929248
AST-885-SS-7	Grab	Soil	4929249
AST-885-SS-8	Grab	Soil	4929250
AST-885-SS-9	Grab	Soil	4929251
AST-885-SS-10	Grab	Soil	4929252

1 COPY TO SECOR International, Inc Attn: Casey Yetman

Lancaster Laboratories

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Michele J. Smith

Michele J. Smith
Group Leader

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929243

AST-885-SS-1 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-1
Collected:11/30/2006 14:40 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	8.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	180.	J	180.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		180.	ug/kg	5
03775	Phenanthrene	85-01-8	N.D.		180.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		180.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		180.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		180.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		180.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		180.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		180.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		180.	ug/kg	5
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		28.	ug/kg	51.55
05466	Toluene	108-88-3	N.D.		57.	ug/kg	51.55
05474	Ethylbenzene	100-41-4	N.D.		57.	ug/kg	51.55
05479	Isopropylbenzene	98-82-8	N.D.		57.	ug/kg	51.55
05498	Naphthalene	91-20-3	N.D.		57.	ug/kg	51.55
06301	Xylene (Total)	1330-20-7	N.D.		57.	ug/kg	51.55

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929243

AST-885-SS-1 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-1
Collected:11/30/2006 14:40 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-1

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 13:10	Joseph M Gambler	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/11/2006 21:14	Kerri E Koch	51.55
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:40	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929244

AST-885-SS-2 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-2
Collected:11/30/2006 14:36 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	18.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		200.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		200.	ug/kg	5
03775	Phenanthrene	85-01-8	880.	J	200.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		200.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		200.	ug/kg	5
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	100.	J	31.	ug/kg	51.39
05466	Toluene	108-88-3	1,600.		63.	ug/kg	51.39
05474	Ethylbenzene	100-41-4	2,100.		63.	ug/kg	51.39
05479	Isopropylbenzene	98-82-8	1,200.		63.	ug/kg	51.39
05498	Naphthalene	91-20-3	4,800.		63.	ug/kg	51.39
06301	Xylene (Total)	1330-20-7	21,000.		63.	ug/kg	51.39

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929244

AST-885-SS-2 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-2
Collected:11/30/2006 14:36 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

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Suite 200
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Exton PA 19341

885-2

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 14:01	Joseph M Gambler	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/11/2006 21:37	Kerri E Koch	51.39
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:36	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929245

AST-885-SS-3 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-3
Collected:11/30/2006 14:11 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

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885-3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	13.1		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	92.	J	38.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		38.	ug/kg	1
03775	Phenanthrene	85-01-8	120.	J	38.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		38.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	76.	J	38.	ug/kg	1
03782	Chrysene	218-01-9	77.	J	38.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	75.	J	38.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	69.	J	38.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	46.	J	38.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	46.	J	38.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		33.	ug/kg	56.56
05466	Toluene	108-88-3	N.D.		65.	ug/kg	56.56
05474	Ethylbenzene	100-41-4	N.D.		65.	ug/kg	56.56
05479	Isopropylbenzene	98-82-8	N.D.		65.	ug/kg	56.56
05498	Naphthalene	91-20-3	N.D.		65.	ug/kg	56.56
06301	Xylene (Total)	1330-20-7	N.D.		65.	ug/kg	56.56

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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Laboratory Chronicle

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929245

AST-885-SS-3 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-3
Collected:11/30/2006 14:11 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:40
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-3

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 14:53	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/11/2006 22:23	Kerri E Koch	56.56
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:11	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929246

AST-885-SS-4 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-4
Collected:11/30/2006 13:57 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
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885-4

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	6.0		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		180.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		180.	ug/kg	5
03775	Phenanthrene	85-01-8	500.	J	180.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		180.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		180.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		180.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		180.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		180.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		180.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		180.	ug/kg	5
	Surrogate recoveries were outside of QC limits for the GC/MS semivolatile compounds. The analysis was repeated outside of the required hold time and surrogate recoveries met requirements. Comparable sample data were observed between the two extractions. The data reported is from the initial extraction of the sample.						
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	68.	J	26.	ug/kg	48.45
05466	Toluene	108-88-3	100.	J	52.	ug/kg	48.45
05474	Ethylbenzene	100-41-4	N.D.		52.	ug/kg	48.45
05479	Isopropylbenzene	98-82-8	N.D.		52.	ug/kg	48.45
05498	Naphthalene	91-20-3	110.	J	52.	ug/kg	48.45
06301	Xylene (Total)	1330-20-7	4,400.		52.	ug/kg	48.45

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929246

AST-885-SS-4 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-4
Collected:11/30/2006 13:57 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-4

CAT No.	Analysis Name	CAS Number	Dry Result	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
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 16:36	Joseph M Gambler	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/11/2006 22:47	Kerri E Koch	48.45
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 13:57	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

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2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929247

AST-885-SS-5 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-5
Collected:11/30/2006 14:01 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

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Suite 200
102 Pickering Way
Exton PA 19341

885-5

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	16.1	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	N.D.	200.	ug/kg	5
03768	Fluorene	86-73-7	N.D.	200.	ug/kg	5
03775	Phenanthrene	85-01-8	1,500.	200.	ug/kg	5
03776	Anthracene	120-12-7	N.D.	200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.	200.	ug/kg	5
03782	Chrysene	218-01-9	N.D.	200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.	200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.	200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	200.	ug/kg	5
	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.					
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	350.	31.	ug/kg	51.55
05466	Toluene	108-88-3	3,300.	61.	ug/kg	51.55
05474	Ethylbenzene	100-41-4	3,400.	61.	ug/kg	51.55
05479	Isopropylbenzene	98-82-8	1,700.	61.	ug/kg	51.55
05498	Naphthalene	91-20-3	5,600.	61.	ug/kg	51.55
06301	Xylene (Total)	1330-20-7	27,000.	61.	ug/kg	51.55

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929247

AST-885-SS-5 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-5
Collected:11/30/2006 14:01 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

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Exton PA 19341

885-5

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 17:27	Joseph M Gambler	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 02:51	Seth J Good	51.55
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:01	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929248

AST-885-SS-6 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-6
Collected:11/30/2006 14:05 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

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885-6

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.3	0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.					
07804	PAHs in Soil by GC/MS					
01195	Pyrene	129-00-0	N.D.	200.	ug/kg	5
03768	Fluorene	86-73-7	1,200.	200.	ug/kg	5
03775	Phenanthrene	85-01-8	2,000.	200.	ug/kg	5
03776	Anthracene	120-12-7	N.D.	200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.	200.	ug/kg	5
03782	Chrysene	218-01-9	N.D.	200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.	200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.	200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.	200.	ug/kg	5
	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.					
02304	UST-Unleaded Soils by 8260B					
05460	Benzene	71-43-2	2,600.	31.	ug/kg	50.61
05466	Toluene	108-88-3	26,000.	610.	ug/kg	506.07
05474	Ethylbenzene	100-41-4	13,000.	61.	ug/kg	50.61
05479	Isopropylbenzene	98-82-8	5,400.	61.	ug/kg	50.61
05498	Naphthalene	91-20-3	15,000.	61.	ug/kg	50.61
06301	Xylene (Total)	1330-20-7	97,000.	610.	ug/kg	506.07

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929248

AST-885-SS-6 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-6
Collected:11/30/2006 14:05 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
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885-6

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/09/2006 19:10	Gregory J Drahovsky	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 03:37	Seth J Good	50.61
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 03:59	Seth J Good	506.07
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:05	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929249

AST-885-SS-7 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-7
Collected:11/30/2006 14:08 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

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102 Pickering Way
Exton PA 19341

885-7

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		200.	ug/kg	5
03768	Fluorene	86-73-7	1,200.		200.	ug/kg	5
03775	Phenanthrene	85-01-8	2,300.		200.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	220.	J	200.	ug/kg	5
03782	Chrysene	218-01-9	220.	J	200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		200.	ug/kg	5
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	160.	J	31.	ug/kg	51.76
05466	Toluene	108-88-3	3,400.		61.	ug/kg	51.76
05474	Ethylbenzene	100-41-4	2,400.		61.	ug/kg	51.76
05479	Isopropylbenzene	98-82-8	2,900.		61.	ug/kg	51.76
05498	Naphthalene	91-20-3	11,000.		61.	ug/kg	51.76
06301	Xylene (Total)	1330-20-7	66,000.		610.	ug/kg	517.6

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929249

AST-885-SS-7 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-7
Collected:11/30/2006 14:08 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-7

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/09/2006 20:01	Gregory J Drahovsky	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 04:22	Seth J Good	51.76
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 04:45	Seth J Good	517.6
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:08	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929250

AST-885-SS-8 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-8
Collected:11/30/2006 14:13 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-8

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.7		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	240.	J	200.	ug/kg	5
03768	Fluorene	86-73-7	N.D.		200.	ug/kg	5
03775	Phenanthrene	85-01-8	N.D.		200.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		200.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	240.	J	200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	220.	J	200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		200.	ug/kg	5
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		35.	ug/kg	57.01
05466	Toluene	108-88-3	N.D.		69.	ug/kg	57.01
05474	Ethylbenzene	100-41-4	N.D.		69.	ug/kg	57.01
05479	Isopropylbenzene	98-82-8	N.D.		69.	ug/kg	57.01
05498	Naphthalene	91-20-3	N.D.		69.	ug/kg	57.01
06301	Xylene (Total)	1330-20-7	N.D.		69.	ug/kg	57.01

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929250

AST-885-SS-8 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-8
Collected:11/30/2006 14:13 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-8

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/09/2006 20:52	Gregory J Drahovsky	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 21:37	Lauren C Marzario	57.01
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:13	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929251

AST-885-SS-9 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-9
Collected:11/30/2006 14:20 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-9

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	15.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	820.	J	200.	ug/kg	5
03768	Fluorene	86-73-7	470.	J	200.	ug/kg	5
03775	Phenanthrene	85-01-8	1,400.		200.	ug/kg	5
03776	Anthracene	120-12-7	200.	J	200.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	490.	J	200.	ug/kg	5
03782	Chrysene	218-01-9	550.	J	200.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	460.	J	200.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	360.	J	200.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	300.	J	200.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	260.	J	200.	ug/kg	5
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		29.	ug/kg	49.5
05466	Toluene	108-88-3	N.D.		59.	ug/kg	49.5
05474	Ethylbenzene	100-41-4	N.D.		59.	ug/kg	49.5
05479	Isopropylbenzene	98-82-8	110.	J	59.	ug/kg	49.5
05498	Naphthalene	91-20-3	550.		59.	ug/kg	49.5
06301	Xylene (Total)	1330-20-7	1,800.		59.	ug/kg	49.5

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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Laboratory Chronicle

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929251

AST-885-SS-9 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-9
Collected:11/30/2006 14:20 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

885-9

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/09/2006 21:43	Gregory J Drahovsky	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 22:00	Lauren C Marzario	49.5
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:20	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929252

AST-885-SS-10 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-10
Collected:11/30/2006 14:23 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

88510

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	20.4		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	N.D.		210.	ug/kg	5
03768	Fluorene	86-73-7	1,200.		210.	ug/kg	5
03775	Phenanthrene	85-01-8	2,000.		210.	ug/kg	5
03776	Anthracene	120-12-7	N.D.		210.	ug/kg	5
03781	Benzo(a)anthracene	56-55-3	N.D.		210.	ug/kg	5
03782	Chrysene	218-01-9	N.D.		210.	ug/kg	5
03786	Benzo(b)fluoranthene	205-99-2	N.D.		210.	ug/kg	5
03788	Benzo(a)pyrene	50-32-8	N.D.		210.	ug/kg	5
03789	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		210.	ug/kg	5
03791	Benzo(g,h,i)perylene	191-24-2	N.D.		210.	ug/kg	5
	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.						
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	110.	J	34.	ug/kg	53.82
05466	Toluene	108-88-3	850.		68.	ug/kg	53.82
05474	Ethylbenzene	100-41-4	2,200.		68.	ug/kg	53.82
05479	Isopropylbenzene	98-82-8	1,200.		68.	ug/kg	53.82
05498	Naphthalene	91-20-3	6,500.		68.	ug/kg	53.82
06301	Xylene (Total)	1330-20-7	17,000.		68.	ug/kg	53.82

Commonwealth of Pennsylvania Lab Certification No. 36-037
The Methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929252

AST-885-SS-10 Grab Soil
AST-885
DUNS# COC: 0135410 AST-885-SS-10
Collected:11/30/2006 14:23 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/16/2006 at 22:41
Discard: 02/15/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

88510

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/09/2006 22:34	Gregory J Drahovsky	5
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/13/2006 09:03	Seth J Good	53.82
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:23	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/16/06 at 10:41 PM

Group Number: 1016432

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06339820003A	Sample number(s): 4929243-4929249							
Moisture				100		99-101		
Batch number: 06339820003B	Sample number(s): 4929250-4929252							
Moisture				100		99-101		
Batch number: 06339SLD026	Sample number(s): 4929243-4929252							
Pyrene	N.D.	33.	ug/kg	91		67-116		
Fluorene	N.D.	33.	ug/kg	97		66-115		
Phenanthrene	N.D.	33.	ug/kg	91		70-107		
Anthracene	N.D.	33.	ug/kg	90		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	89		73-111		
Chrysene	N.D.	33.	ug/kg	89		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	84		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	89		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	94		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	99		66-120		
Batch number: Q063451AA	Sample number(s): 4929243-4929246							
Benzene	N.D.	25.	ug/kg	99	102	77-119	3	30
Toluene	N.D.	50.	ug/kg	95	97	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	91	95	82-115	4	30
Isopropylbenzene	N.D.	50.	ug/kg	90	93	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	96	97	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	97	82-117	4	30
Batch number: Q063451AB	Sample number(s): 4929247-4929249							
Benzene	N.D.	25.	ug/kg	99	102	77-119	3	30
Toluene	N.D.	50.	ug/kg	95	97	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	91	95	82-115	4	30
Isopropylbenzene	N.D.	50.	ug/kg	90	93	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	96	97	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	97	82-117	4	30
Batch number: Q063462AA	Sample number(s): 4929250-4929251							
Benzene	N.D.	25.	ug/kg	96	99	77-119	2	30
Toluene	N.D.	50.	ug/kg	92	93	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	90	91	82-115	1	30
Isopropylbenzene	N.D.	50.	ug/kg	89	90	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	95	94	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	94	82-117	1	30
Batch number: Q063462AB	Sample number(s): 4929252							
Benzene	N.D.	25.	ug/kg	96	99	77-119	2	30
Toluene	N.D.	50.	ug/kg	92	93	81-116	1	30
Ethylbenzene	N.D.	50.	ug/kg	90	91	82-115	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.

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/16/06 at 10:41 PM

Group Number: 1016432

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Isopropylbenzene	N.D.	50.	ug/kg	89	90	79-117	1	30
Naphthalene	N.D.	50.	ug/kg	95	94	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	94	82-117	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: 06339820003A	Sample number(s): 4929243-4929249					BKG: P929267			
Moisture						19.5	19.9	2	15
Batch number: 06339820003B	Sample number(s): 4929250-4929252					BKG: P929269			
Moisture						10.1	9.7	5	15
Batch number: 06339SLD026	Sample number(s): 4929243-4929252					UNSPK: P929240			
Pyrene	87	80	28-151	8	30				
Fluorene	99	88	47-126	11	30				
Phenanthrene	96	113	35-144	14	30				
Anthracene	93	104	38-142	11	30				
Benzo(a)anthracene	87	94	41-136	8	30				
Chrysene	89	98	40-135	9	30				
Benzo(b)fluoranthene	80	76	29-151	4	30				
Benzo(a)pyrene	83	86	37-144	3	30				
Indeno(1,2,3-cd)pyrene	71	85	39-141	17	30				
Benzo(g,h,i)perylene	64	78	33-145	20	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: 06339SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4929243	84	102	99
4929244	103	95	102
4929245	93	96	100
4929246	87	51*	51
4929247	113	88	96
4929248	120	87	83
4929249	109	73	71
4929250	97	98	102
4929251	91	83	80
4929252	96	74	67
Blank	93	92	95
LCS	93	96	99

*- 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.

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2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc Group Number: 1016432
Reported: 12/16/06 at 10:41 PM

Surrogate Quality Control

MS	96	88	94	
MSD	91	96	88	
Limits:	47-128	55-123	51-158	

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063451AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929243	85	87	77	76
4929244	79	80	97	107
4929245	85	87	78	80
4929246	88	90	98	86
Blank	104	107	99	91
LCS	101	104	99	98
LCSD	99	103	97	92
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063451AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929247	81	82	112	80
4929248	78	80	67*	76
4929249	78	80	69*	77
Blank	96	100	88	85
LCS	101	104	99	98
LCSD	99	103	97	92
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063462AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929250	80	82	71	73
4929251	80	80	82	96
Blank	95	97	89	86
LCS	99	102	94	94
LCSD	99	102	94	90
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063462AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929252	75	78	80	94
Blank	94	96	86	86
LCS	99	102	94	94
LCSD	99	102	94	90
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.

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PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/16/06 at 10:41 PM

Group Number: 1016432

*- 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.

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1016432 Sample # 4929243-52

COC # 0135410

Please print. Instructions on reverse side correspond with circled numbers.

(1)

Client: SECOR INTERNATIONAL Acct. #:

Project Name/#: AST-885 PWSID #:

Project Manager: CASEY YETMAN P.O.#:

Sampler: JOHN BRUCHETTE Quote #:

Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR#:

(5) Analyses Requested — Preservation Codes

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

(6)

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	Soil	Water	Other	(4) Total # of Containers	FUEL OIL 4,5,6 or WASTE OIL PLUS	XYLENES PER PADEP GASOLINE	SHORT LIST NO LEAD							Remarks
AST-885-SS-1	11-30-06	1440	X		X			2	X									
AST-885-SS-2	11-30-06	1436	X		X			2	X									
AST-885-SS-3	11-30-06	1411	X		X			2	X									
AST-885-SS-4	11-30-06	1357	X		X			2	X									
AST-885-SS-5	11-30-06	1401	X		X			2	X									
AST-885-SS-6	11-30-06	1405	X		X			2	X									
AST-885-SS-7	11-30-06	1408	X		X			2	X									
AST-885-SS-8	11-30-06	1413	X		X			2	X									
AST-885-SS-9	11-30-06	1420	X		X			2	X									
AST-885-SS-10	11-30-06	1423	X		X			2	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 #: 484.875.3075 Fax #: 484.875.9286
E-mail address: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
Casey Yetman	12/1/06	1220			
			[signature]	12/6/06	0930

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

ANALYTICAL RESULTS

Prepared for:

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

484-875-3075

Prepared by:

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

SAMPLE GROUP

The sample group for this submittal is 1016430. Samples arrived at the laboratory on Saturday, December 02, 2006.

Client Description			Lancaster Labs Number
AST-884-SS-1	Grab	Soil	4929240
AST-884-SS-2	Grab	Soil	4929241

1 COPY TO SECOR International, Inc Attn: Casey Yetman

Questions? Contact your Client Services Representative
Loran A Carter at (717) 656-2300

Respectfully Submitted,

Richard H. Karam
Group Leader

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929240

AST-884-SS-1 Grab Soil
AST-884
DUNS# COC: 0135407 AST-884-SS-1
Collected:11/30/2006 14:47 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/13/2006 at 15:52
Discard: 02/12/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

884S1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	21.9		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	110.	J	43.	ug/kg	1
03768	Fluorene	86-73-7	390.		43.	ug/kg	1
03775	Phenanthrene	85-01-8	660.		43.	ug/kg	1
03776	Anthracene	120-12-7	45.	J	43.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	73.	J	43.	ug/kg	1
03782	Chrysene	218-01-9	100.	J	43.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	88.	J	43.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	81.	J	43.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	47.	J	43.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	58.	J	43.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	N.D.		31.	ug/kg	48.97
05466	Toluene	108-88-3	120.	J	63.	ug/kg	48.97
05474	Ethylbenzene	100-41-4	740.		63.	ug/kg	48.97
05479	Isopropylbenzene	98-82-8	490.		63.	ug/kg	48.97
05498	Naphthalene	91-20-3	2,700.		63.	ug/kg	48.97
06301	Xylene (Total)	1330-20-7	6,400.		63.	ug/kg	48.97

Commonwealth of Pennsylvania Lab Certification No. 36-037
The methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Laboratory Chronicle

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929240

AST-884-SS-1 Grab Soil
AST-884
DUNS# COC: 0135407 AST-884-SS-1
Collected:11/30/2006 14:47 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/13/2006 at 15:52
Discard: 02/12/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

884S1

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 09:43	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/12/2006 02:28	Seth J Good	48.97
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:47	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929241

AST-884-SS-2 Grab Soil
AST-884
DUNS# COC: 0135407 AST-884-SS-1
Collected:11/30/2006 14:45 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/13/2006 at 15:52
Discard: 02/12/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

884S2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Units	Dilution Factor
00111	Moisture	n.a.	17.6		0.50	%	1
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported above is on an as-received basis.						
07804	PAHs in Soil by GC/MS						
01195	Pyrene	129-00-0	240.		40.	ug/kg	1
03768	Fluorene	86-73-7	N.D.		40.	ug/kg	1
03775	Phenanthrene	85-01-8	170.	J	40.	ug/kg	1
03776	Anthracene	120-12-7	N.D.		40.	ug/kg	1
03781	Benzo(a)anthracene	56-55-3	140.	J	40.	ug/kg	1
03782	Chrysene	218-01-9	150.	J	40.	ug/kg	1
03786	Benzo(b)fluoranthene	205-99-2	150.	J	40.	ug/kg	1
03788	Benzo(a)pyrene	50-32-8	140.	J	40.	ug/kg	1
03789	Indeno(1,2,3-cd)pyrene	193-39-5	100.	J	40.	ug/kg	1
03791	Benzo(g,h,i)perylene	191-24-2	96.	J	40.	ug/kg	1
02304	UST-Unleaded Soils by 8260B						
05460	Benzene	71-43-2	55.	J	29.	ug/kg	48.54
05466	Toluene	108-88-3	N.D.		59.	ug/kg	48.54
05474	Ethylbenzene	100-41-4	N.D.		59.	ug/kg	48.54
05479	Isopropylbenzene	98-82-8	N.D.		59.	ug/kg	48.54
05498	Naphthalene	91-20-3	N.D.		59.	ug/kg	48.54
06301	Xylene (Total)	1330-20-7	N.D.		59.	ug/kg	48.54

Commonwealth of Pennsylvania Lab Certification No. 36-037
The methanol vials were received at the laboratory on 12/04/06 @ 0920 with a temperature of 3.0 C.

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

Laboratory Chronicle

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Lancaster Laboratories Sample No. SW 4929241

AST-884-SS-2 Grab Soil
AST-884
DUNS# COC: 0135407 AST-884-SS-1
Collected:11/30/2006 14:45 by JB

Account Number: 11183

Submitted: 12/02/2006 09:30
Reported: 12/13/2006 at 15:52
Discard: 02/12/2007

SECOR International, Inc
Suite 200
102 Pickering Way
Exton PA 19341

884S2

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00111	Moisture	EPA 160.3 modified	1	12/05/2006 16:48	Scott W Freisher	1
07804	PAHs in Soil by GC/MS	SW-846 8270C	1	12/07/2006 12:18	Joseph M Gambler	1
02304	UST-Unleaded Soils by 8260B	SW-846 8260B	1	12/11/2006 20:52	Kerri E Koch	48.54
00405	GC/MS - Field Preserved MeOH	SW-846 5035	1	11/30/2006 14:45	Client Supplied	n.a.
07806	BNA Soil Extraction	SW-846 3550B	1	12/06/2006 01:30	Patricia L Foreman	1

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/13/06 at 03:52 PM

Group Number: 1016430

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06339820003A	Sample number(s): 4929240-4929241							
Moisture				100		99-101		
Batch number: 06339SLD026	Sample number(s): 4929240-4929241							
Pyrene	N.D.	33.	ug/kg	91		67-116		
Fluorene	N.D.	33.	ug/kg	97		66-115		
Phenanthrene	N.D.	33.	ug/kg	91		70-107		
Anthracene	N.D.	33.	ug/kg	90		69-109		
Benzo(a)anthracene	N.D.	33.	ug/kg	89		73-111		
Chrysene	N.D.	33.	ug/kg	89		72-110		
Benzo(b)fluoranthene	N.D.	33.	ug/kg	84		66-123		
Benzo(a)pyrene	N.D.	33.	ug/kg	89		71-119		
Indeno(1,2,3-cd)pyrene	N.D.	33.	ug/kg	94		66-123		
Benzo(g,h,i)perylene	N.D.	33.	ug/kg	99		66-120		
Batch number: Q063451AA	Sample number(s): 4929241							
Benzene	N.D.	25.	ug/kg	99	102	77-119	3	30
Toluene	N.D.	50.	ug/kg	95	97	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	91	95	82-115	4	30
Isopropylbenzene	N.D.	50.	ug/kg	90	93	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	96	97	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	97	82-117	4	30
Batch number: Q063451AB	Sample number(s): 4929240							
Benzene	N.D.	25.	ug/kg	99	102	77-119	3	30
Toluene	N.D.	50.	ug/kg	95	97	81-116	3	30
Ethylbenzene	N.D.	50.	ug/kg	91	95	82-115	4	30
Isopropylbenzene	N.D.	50.	ug/kg	90	93	79-117	3	30
Naphthalene	N.D.	50.	ug/kg	96	97	52-121	1	30
Xylene (Total)	N.D.	50.	ug/kg	93	97	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: 06339820003A	Sample number(s): 4929240-4929241					BKG: P929267			
Moisture						19.5	19.9	2	15
Batch number: 06339SLD026	Sample number(s): 4929240-4929241					UNSPK: 4929240			
Pyrene	87	80	28-151	8	30				
Fluorene	99	88	47-126	11	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.

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/13/06 at 03:52 PM

Group Number: 1016430

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
Phenanthrene	96	113	35-144	14	30				
Anthracene	93	104	38-142	11	30				
Benzo(a)anthracene	87	94	41-136	8	30				
Chrysene	89	98	40-135	9	30				
Benzo(b)fluoranthene	80	76	29-151	4	30				
Benzo(a)pyrene	83	86	37-144	3	30				
Indeno(1,2,3-cd)pyrene	71	85	39-141	17	30				
Benzo(g,h,i)perylene	64	78	33-145	20	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: 06339SLD026

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
4929240	101	91	85
4929241	84	90	92
Blank	93	92	95
LCS	93	96	99
MS	96	88	94
MSD	91	96	88
Limits:	47-128	55-123	51-158

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063451AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929241	85	89	76	76
Blank	104	107	99	91
LCS	101	104	99	98
LCSD	99	103	97	92
Limits:	71-114	70-109	70-123	70-111

Analysis Name: UST-Unleaded Soils by 8260B
Batch number: Q063451AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4929240	77	77	73	86
Blank	96	100	88	85
LCS	101	104	99	98
LCSD	99	103	97	92
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.

Lancaster Laboratories, Inc.
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Lancaster Laboratories

Quality Control Summary

Client Name: SECOR International, Inc
Reported: 12/13/06 at 03:52 PM

Group Number: 1016430

*- 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.

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 11183 Group# 1016430 Sample # 4929240-41

COC # 0135407

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: SECOR INTERNATIONAL Acct. #:
Project Name/#: AST-884 PWSID #:
Project Manager: CASEY YETMAN P.O.#:
Sampler: JOHN BURCHETTE Quote #:
Name of state where samples were collected: PA

For Lab Use Only
FSC:
SCR#:

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 | Matrix: Soil | Water | Other | (4) Total # of Containers | (5) Analyses Requested: FUEL OIL 4,5,+6 & WASTE OIL DUST | XYLENES PER DADEP GASOLINE | SHORT LIST * NO LEAD | Remarks (6)

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water	Other	Total # of Containers	FUEL OIL 4,5,+6 & WASTE OIL DUST	XYLENES PER DADEP GASOLINE	SHORT LIST * NO LEAD	Remarks
AST-884-SS-1	11-30-06	1447	X		X			2	X			
AST-884-SS-2	11-30-06	1445	X		X			2	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 #: 484.875.3075 Fax #: 484.875.9286
E-mail address: cyetman@secor.com

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg) TX TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

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
Casey Yetman	12/1/06	1220			

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

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5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

RECEIVED APR 13 2007

April 5, 2007

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Dear Ms. Yetman:

Enclosed are analytical results for samples submitted to Pace Analytical by Sunoco_SECOR International, Inc. - Exton. The samples were received on March 20, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-2076 when inquiring about this report.

Client Site: 6250-01
Client Ref.: AST-885

Pace Sample Identification	Client Sample Identification
0703-3388	AST-885-CS-12
0703-3389	AST-885-CS-11
0703-3390	AST-885-CS-10
0703-3391	AST-885-CS-9
0703-3392	AST-885-CS-8
0703-3393	AST-885-CS-7
0703-3394	AST-885-CS-6
0703-3395	AST-885-CS-5

Pace Sample Identification	Client Sample Identification
0703-3396	AST-885-CS-4
0703-3397	AST-885-CS-3
0703-3398	AST-885-CS-13
0703-3399	AST-885-CS-2
0703-3400	AST-885-CS-1
0703-3401	TRIP BLANK
0703-3402	AST-885-CS-14
0703-3403	AST-885-CS-15

General Comments: Cooler temperature 3 ° C upon receipt. Ice was present.

Please call me if you have any questions regarding the information contained within this report.

Sincerely,
Carin A. Ferris

Carin A. Ferris
Project Manager

CAM: jld

Enclosures

Page 1 of 19

REPORT OF LABORATORY ANALYSIS

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Fax: 724.327.7793

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3388**
Client Sample ID: AST-885-CS-12
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	88	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	500	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	160	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3389**
Client Sample ID: AST-885-CS-11
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	81	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Cumene	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Ethylbenzene	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Naphthalene	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Toluene	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Xylenes (Total)	8260B[1]	<95	95	ug/kg	JEC	03/26/2007	0058937-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3390**
Client Sample ID: AST-885-CS-10
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	83	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Chrysene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Fluorene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Phenanthrene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330
Pyrene	8270C(1)	<400	400	ug/kg	SPL	04/04/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<90	90	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Cumene	8260B(1)	99	90	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Ethylbenzene	8260B(1)	<90	90	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Naphthalene	8260B(1)	100	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<90	90	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Xylenes (Total)	8260B(1)	150	90	ug/kg	JEC	03/26/2007	0058937-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3391**
Client Sample ID: AST-885-CS-9
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	73	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C(1)	1200	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Cumene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Ethylbenzene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Naphthalene	8260B(1)	210	110	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Xylenes (Total)	8260B(1)	1000	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3392**
Client Sample ID: AST-885-CS-8
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	73	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C(1)	1900	450	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C(1)	<450	450	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Cumene	8260B(1)	250	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Ethylbenzene	8260B(1)	340	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Naphthalene	8260B(1)	740	110	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<110	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Xylenes (Total)	8260B(1)	3100	110	ug/kg	JEC	03/26/2007	0058937-1	<5.0

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3393**
Client Sample ID: AST-885-CS-7
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	80	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C[1]	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	<100	100	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Cumene	8260B[1]	350	100	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Ethylbenzene	8260B[1]	510	100	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Naphthalene	8260B[1]	1200	100	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[1]	230	100	ug/kg	JEC	03/26/2007	0058937-1	<5.0
Xylenes (Total)	8260B[1]	7300	100	ug/kg	JEC	03/26/2007	0058937-1	<5.0

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3394**
Client Sample ID: AST-885-CS-6
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	79	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Chrysene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Fluorene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Phenanthrene	8270C(1)	720	420	ug/kg	SPL	04/03/2007	0058981-1	<330
Pyrene	8270C(1)	<420	420	ug/kg	SPL	04/03/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<92	92	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	<92	92	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	<92	92	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	190	92	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<92	92	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	810	92	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3395**
Client Sample ID: AST-885-CS-5
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	87	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C[1]	2500	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C[1]	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B[1]	110	95	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B[1]	1100	95	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B[1]	1800	95	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B[1]	4300	95	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B[1]	3300	95	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B[1]	22000	95	ug/kg	MAK	03/28/2007	0059060-1	<250

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3396**
Client Sample ID: AST-885-CS-4
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	88	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	190	81	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	1100	81	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	1700	81	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	4600	81	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	3400	81	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	21000	81	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3397**
Client Sample ID: AST-885-CS-3
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	88	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	3300	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	3900	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<90	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	480	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	440	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	4100	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	610	90	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	18000	90	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3398**
Client Sample ID: AST-885-CS-13
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	86	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	1200	380	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<380	380	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	480	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<94	94	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	1900	94	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Export, PA 15632
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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3399**
Client Sample ID: AST-885-CS-2
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	80	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	490	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	610	410	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<410	410	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	550	83	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	440	83	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	1600	83	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	1400	83	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	1100	83	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	7900	83	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3400**
Client Sample ID: AST-885-CS-1
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	85	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	600	390	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	<390	390	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	110	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	520	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	2100	96	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Ms. Casey Yetman
Sunoco_SECOR International, Inc. - Exton
102 Pickering Way, Suite 200
Exton, PA 19341

Client Site: 6250-01
Client Ref.: AST-885

Lab Project ID: **07-2076**
Lab Sample ID: **0703-3403**
Client Sample ID: AST-885-CS-15
Sample Matrix: Solid

Date Sampled: 03/14/2007
Date Received: 03/20/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	84	N/A	%	JPZ	03/21/2007	N/A	N/A

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, GC/MS								
Anthracene	8270C(1)	450	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)anthracene	8270C(1)	760	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(a)pyrene	8270C(1)	460	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(b)fluoranthene	8270C(1)	680	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Benzo(ghi)perylene	8270C(1)	<400	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Chrysene	8270C(1)	560	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Fluorene	8270C(1)	<400	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Indeno(1,2,3-cd)pyrene	8270C(1)	<400	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Phenanthrene	8270C(1)	1600	400	ug/kg	SPL	04/02/2007	0058981-1	<330
Pyrene	8270C(1)	1100	400	ug/kg	SPL	04/02/2007	0058981-1	<330

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, MS								
Benzene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Cumene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Ethylbenzene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Naphthalene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Toluene	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250
Xylenes (Total)	8260B(1)	<96	96	ug/kg	MAK	03/28/2007	0059060-1	<250

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

REPORT OF LABORATORY ANALYSIS

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CHAIN OF CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of

1029914

Section A
Required Client Information:

Company: SECOR INTERNATIONAL	
Address: 102 PICKERING WAY, SUITE 200	
EXTON, PA 19341	
Email To: jbourchette@secor.com	
Phone: 484.875.3075	Fax:
Requested Due Date/TAT:	

Section B
Required Project Information:

Report To: John Bourchette	
Copy To: Casey Vetman cvetman@secor.com	
Purchase Order No.:	
Project Name: AST-885	
Project Number: 6250.01	

Section C
Invoice Information:

Attention: CASEY VETMAN	
Company Name: SECOR INTERNATIONAL	
Address: SAME	
Pace Quote Reference: SUNOCO	
Pace Project Manager: CARIN	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ Other PADEP

SITE LOCATION

☐ GA ☐ IL ☐ IN ☐ MI ☐ MN ☐ NC
☐ OH ☐ SC ☐ WI ☒ OTHER PA

Section D
Required Client Information

SAMPLE ID

One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	Requested Analysis: GASOL PADEP STOREST DRO EXT. OILS 45 (6) WASTE OIL PLUS VOLATILES + NAPHTHALENE	Residual Chlorine (Y/N)	Pace Project Number / Lab I.D
1	AST-885-CS-12	SL	G	3-14-07	1050	3-14-07	1050		5	2					2	1			X		03-3388
2	AST-885-CS-11	SL	G			3-14-07	1100		5	2					2	1			X		89
3	AST-885-CS-10	SL	G			3-14-07	1105		5	2					2	1			X		90
4	AST-885-CS-9	SL	G			3-14-07	1120		5	2					2	1			X		91
5	AST-885-CS-8	SL	G			3-14-07	1130		5	2					2	1			X		92
6	AST-885-CS-7	SL	G			3-14-07	1205		5	2					2	1			X		93
7	AST-885-CS-6	SL	G			3-14-07	1215		5	2					2	1			X		94
8	AST-885-CS-5	SL	G			3-14-07	1225		5	2					2	1			X		95
9	AST-885-CS-4	SL	G			3-14-07	1400		5	2					2	1			X		96
10	AST-885-CS-3	SL	G			3-14-07	1425		5	2					2	1			X		97
11	AST-885-CS-13	SL	G			3-14-07	1435		5	2					2	1			X		98
12	AST-885-CS-2	SL	G			3-14-07	1450		5	2					2	1			X		99

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	3-14-07	1600			
US Cargo			Courier - Courtesy Pace	3/20/07	11:00

SAMPLE CONDITION

Temp in °C	Received on Ice Y/N	Custody Sealed Cooler Y/N	Samples Intact Y/N
3	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

SEE REVERSE SIDE FOR INSTRUCTIONS

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CHAIN OF CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of

1029913

Section A
Required Client Information:

Company	SECOR INTERNATIONAL
Address	105 PICKERING WAY, SUITE 200
	EXTON, PA 19341
Email To:	jbourchette@secor.com
Phone	Fax
Requested Due Date/TAT:	

Section B
Required Project Information:

Report To:	John Bourchette
Copy To:	CASEY VETMAN
	cvetman@secor.com
Purchase Order No.:	
Project Name:	AST-885
Project Number:	

Section C
Invoice Information:

Attention:	CASEY VETMAN
Company Name:	SECOR INTERNATIONAL
Address:	SAME
Pace Quote Reference:	SUNOCO
Pace Project Manager:	CARIN.
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ Other PADEP

SITE LOCATION

☐ GA ☐ IL ☐ IN ☐ MI ☐ MN ☐ NC
☐ OH ☐ SC ☐ WI ☑ OTHER PA

Section D
Required Client Information

SAMPLE ID

One Character per box.
(A-Z, 0-9 / .-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	Requested Analysis: PADEP GASOLINE SHEETS 5 & 6 ECB FULL LIST VOC WITH MTBE ONLY PLUS XYLENES + NAPHTHALENE + LEAD	Residual Chlorine (Y/N)	Pace Project Number / Lab I.D
1	AST-885-CS-1	SL	G			3-11-07	1100		5	2					2	1					03-37100
2	TRIP BLANK	WT	G			3-14-07	0800		2	2					2	1					
3	AST-885-CS-14	SL	G			3-14-07	1515		5	2					2	1					
4	AST-885-CS-15	SL	G			3-14-07	1515		5	2					2	1					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	3-11-07	1100			
UPS			Courier - Client Courtesy Pace	3/20/07	11:00

SAMPLE CONDITION

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
3	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

SEE REVERSE SIDE FOR INSTRUCTIONS

APPENDIX B

2630-PM-BECB0514 Rev. 4/2013
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

STORAGE TANKS REGISTRATION / PERMITTING APPLICATION FORM

Before completing this form, read the step-by-step instructions provided in this application package.

	DEP USE ONLY
51-33620 Facility ID #	Client ID#
	Site ID#
	Account #
	Auth ID#
Point Breeze Processing Area Facility Name	APS ID#
	Master Auth ID#

I. PURPOSE OF SUBMITTAL

INITIAL (Applies to First-Time Facility Registration)

- ☐ Register Tanks(s) to be Used*
- ☐ Register Tank(s) to be Removed
- ☐ Register Tank(s) to be Temporarily Out of Use
- ☐ Register Tank(s) to be Closed in Place

AMENDED (Applies to Currently Registered Tank(s) or Existing Facility)

- ☐ Changed Owner Information
- ☐ Changed Facility Information
- ☒ Changed to Currently In Use Tank(s)*
- ☐ Changed to Temporarily Out of Use Tank(s)
- ☐ Changed Product
- ☐ Changed Contact Information
- ☐ Changed Facility Operator Information
- ☐ Added Tank(s) to Existing Facility*
- ☐ Changed to Permanently Closed Tank(s)/Removed
- ☐ Changed to Exempt Tank(s)

CHANGE OF OWNERSHIP

- ☐ Tanks Changed Ownership and Remain at Same Facility*

* For Underground Storage Tanks (UST), attach the UST Operator Training Documentation Form (2630-PM-BECB0514a) and copies of the Class A and Class B operator training certificates.

II. CURRENT OR NEW TANK OWNER / CLIENT INFORMATION

DEP Client ID#	Client Type/Code	Fee Kind (check one if applicable)
298341	PACOR	☐ Volunteer Fire Co/EMS Org ☐ State Govt ☐ Fed Govt

Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Dun & Bradstreet ID#
Philadelphia Energy Solutions Refining and Marketing LLC	61-1689574	078625328

Individual Last Name	First Name	MI	Suffix	SSN
Barksdale	Charles	D.	Jr.	

Additional Individual Last Name	First Name	MI	Suffix	SSN

Mailing Address Line 1	Mailing Address Line 2
3144 Passyunk Ave	

Address Last Line – City	State	ZIP+4	Country
Philadelphia	PA	19145-5299	USA

Client Contact Last Name	First Name	MI	Suffix
Keeler	James	A	

Client Contact Title	Phone	Ext
Vice President and General Manager	215-339-7414	

E-mail Address	FAX
James.Keeler@PES-Companies.com	215-339-5770

III. SITE INFORMATION

DEP Site ID#	Site Name
456930	Philadelphia Energy Solutions Refining and Marketing LLC

EPA ID#	PAD049791098	Estimated Number of Employees to be Present at Site	900

Description of Site
Petroleum Refinery

County Name	Municipality	City	Boro	Twp	State
Philadelphia	Philadelphia	☒	☐	☐	
		☐	☐	☐	

Site Location Line 1	Site Location Line 2
3144 Passyunk Ave	

Site Location Last Line – City	State	ZIP+4
Philadelphia	PA	19145-5299

Detailed Written Directions to Site
From 400 Market Street, Harrisburg, PA: Start southeast on S 14th Street towards Grace Street. S 14th Street becomes Mulberry Street. Turn Right onto S Cameron Street / PA-230. Turn Left onto Paxton Street. Turn Right onto S 13th street. Merge into I-93 North toward Hershey. Merge onto I-283 South via exit 46A. Merge onto I-76 East. Take exit 326 toward I-476 / Philadelphia / US-202 / Valley Forge which is I-76 East. Take the Passyunk Ave. exit. Turn right onto Passyunk avenue to a stop light in left lane. Then take Frontage Street to refinery.

Site Contact Last Name	First Name	MI	Suffix
Barksdale	Charles	D	Jr.

Site Contact Title	Site Contact Firm
Site Environmental Manager	Philadelphia Enery Solutions Refining and Marketing LLC

Mailing Address Line 1	Mailing Address Line 2
3144 Passyunk Ave	

Address Last Line – City	State	ZIP+4
Philadelphia	PA	19145-5299

Phone	Ext	FAX	E-mail Address
215-339-2074			Charles.Barksdale@PES-Companies.com

NAICS Codes (Two- & Three-Digit Codes – List All That Apply)	6-Digit Code (Optional)
324, 325	324110, 325110

Site to Client Relationship
OWNOP

IV. FACILITY INFORMATION

DEP Storage Tank Facility ID#	Facility Name	Facility Kind
51-33620	Point Breeze Processing Area	Storage Tank Location

Facility Location Line 1 (if different than Site Location) | **Facility Location Line 2**

Facility Location Last Line - City | **State** | **ZIP+4**

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
UTM Zone 18 - N 4419.144 - E 482.671						

Horizontal Accuracy Measure Feet --or-- Meters

Horizontal Reference Datum Code
- ☐ North American Datum of 1927
- ☐ North American Datum of 1983
- ☐ World Geodetic System of 1984

Horizontal Collection Method Code

Reference Point Code

Altitude Feet --or-- Meters

Altitude Datum Name
- ☐ The National Geodetic Vertical Datum of 1929
- ☐ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code

Geometric Type Code

Data Collection Date

Source Map Scale Number Inch(es) = Feet

--or-- Centimeter(s) = Meters

Flammable & Combustible Liquid Permit # (if applicable)

State or Municipality that Issued the Permit

FACILITY OPERATOR INFORMATION

☒ **Same as Owner Identified in Section II.** ☐ **Different than Owner Identified in Section II; identified below.**

DEP Client ID# | **Client Type / Code**

Organization Name or Registered Fictitious Name | **Employer ID# (EIN)** | **Dun & Bradstreet ID#**

Individual Last Name | **First Name** | **MI** | **Suffix** | **SSN**

Additional Individual Last Name | **First Name** | **MI** | **Suffix** | **SSN**

Mailing Address Line 1 | **Mailing Address Line 2**

Address Last Line – City | **State** | **ZIP+4** | **Country**

Client Contact Last Name | **First Name** | **MI** | **Suffix**

Client Contact Title | **Phone** | **Ext**

E-mail Address | **FAX**

V. CHANGE OF OWNERSHIP INFORMATION

☐ **All Tanks Changed Ownership at the Facility**

☐ **Some Tanks Changed Ownership at the Facility** (List all applicable tank numbers in Section VI.)

OWNERSHIP CHANGE TO - Client information is noted in Section II.

OWNERSHIP CHANGE FROM (previous owner information)

Name			
Employer ID# (EIN) or SSN			
Mailing Address Line 1			
Mailing Address Line 2			
Address Last Line - City		**State**	**ZIP+4**
Previous Facility ID#			
Date of Sale/Transfer			

SIGNATURE & CERTIFICATION OF PREVIOUS OWNER

Previous owner's signature is not available. As required, the "new" owner has attached a deed of transfer or other proof of ownership to this application. ☐ **Yes** ☐ **No** ☐ **N/A**

I have reviewed this form for submission to the Department. I certify under penalty of law as provided in 18 PA. C.S.A. §4903 (relating to false swearing) and 18 PA. C.S.A. §4904 (relating to unsworn falsification to authorities), that I have the authority to sign this Section for the transfer of permit or registration for the storage tanks listed herein. Further, I certify that all information provided in Section V is true, accurate and complete to the best of my knowledge and belief.

Type or Print Previous Owner Name

Previous Owner Signature	**Title**	**Date**

Facility ID# 51-33620 Facility Name Point Breeze Processing Area

VI. STORAGE DESCRIPTION

Type or print legibly each regulated storage tank at this facility under your ownership.
Status Codes: C-Currently in Use T-Temporarily Out of Use E-Exempt R-Removed P-Closed In Place
Type Codes: M-Manufactured F-Field Constructed

A. ABOVEGROUND TANKS. List all new tanks. If amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum Based Mixture)	CAS# (If Hazardous Substance)	Exempt Reference Code
086A		C	M		6/21/2013	6346200	OTHER	Crude Oil	8002-05-9	
A										
A										
A										
A										
A										
A										
A										
A										
A										

B. UNDERGROUND TANKS. List all new tanks. If amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum Based Mixture)	CAS# (If Hazardous Substance)	Exempt Reference Code

Facility ID# 51-33624 Facility Name Girard Point Processing Area

VII. ABOVEGROUND & UNDERGROUND NEW TANK INSTALLATION INFORMATION

The DEP Certified Installer should complete this section. New tanks listed in Section VI must also be listed in this Section. Write the Tank Number(s) and place an ☒ in the appropriate box for each component that was installed.

Tank Construction & Corrosion Protection (1)	Tank # 086A	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Unprotected Steel (Single Wall)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Cathodically Protected Steel (Galvanic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Cathodically Protected Steel (Impressed Current)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Unprotected Steel (Double Wall)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Fiberglass (Single Wall)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Fiberglass (Double Wall)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Steel W/Plastic or Fiberglass Jacket or Double Wall Act 100	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Steel With FRP Coating (Act 100 or Equivalent)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
I. Steel With Lined Interior	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Concrete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
O. Cathodically Protected Double Wall Steel (Galvanic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
P. Cathodically Protected Steel With Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Q. Double Bottom (AST's Only)	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
R. Molded Plastic Form (AST's Only)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Stainless Steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
T. Aluminum	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
U. Fire Protected Double Wall AST	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Facility ID# 51-33620 Facility Name Point Breeze Processing Area

Underground Piping Construction & Corrosion Protection (2)	Tank # N/A	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Bare Steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Cathodically Protected Metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Copper	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Single Wall Fiberglass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Single Wall Flexible (Non-Metallic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
I. Double Wall Metallic Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Double Wall Rigid (FRP) Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Double Wall Flexible Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Trench Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Aboveground Piping Construction & Corrosion Protection (3)	**Tank # 086A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
A. Carbon Steel	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Cathodically Protected Metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Copper	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Single Wall Fiberglass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Single Wall Flexible (Non-Metallic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. PVC	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
I. Double Wall - Metallic Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Double Wall - Rigid (FRP) Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Double Wall - Flexible Primary	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Stainless Steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Spill Prevention (6) UST Only	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
Y. Installed and Liquid Tight	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Fill In Less Than 25 Gallons (Exempt)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Facility ID# 51-33620 Facility Name Point Breeze Processing Area

Overfill Prevention (7)	Tank # 086A	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Overfill Alarm	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Ball Float Valve and No Air Eliminator	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Fill In Less Than 25 Gallons (Exempt)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Drop Tube Shutoff Device	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Y. Yes (AST only)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Emergency Containment (16) ASTs Only	**Tank # 086A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
E. Exempt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. No	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Y. Yes	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
V. Underground Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Secondary Containment (17) ASTs Only	**Tank # 086A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
E. Exempt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. No	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Y. Yes	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
V. Underground Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Stage I Vapor Recovery (19) USTs Only	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
A. Coax	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. 2 Point	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. None or Incomplete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Stage II Vapor Recovery (20)	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
A. Complete Balance System	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Complete Assist System	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. UG Piping Only	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Facility ID# 51-33620 Facility Name Point Breeze Processing Area

Tank-top Containment Sumps Present (21) USTs Only	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
N. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. At some penetrations	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
A. At all penetrations	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Under-dispenser Containment Present (22) USTs Only	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
N. None	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. At some dispensers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
A. Under all dispensers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Line Leak Detector Shuts Off Pump (23) USTs Only	**Tank # N/A**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
N. No	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Y. Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Facility ID# 51-33620 Facility Name Point Breeze Processing Area

VIII. ABOVEGROUND & UNDERGROUND TANK INFORMATION FOR PERMANENT CLOSURE

Write the Tank Number(s) and place an ☒ in the appropriate box for each tank that was removed or closed in place.

Items 2 & 3 below apply to large ASTs and all USTs	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
1. Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. Closure document submitted to the appropriate DEP regional office.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3. Closure document kept on file by owner.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. This registration is conditioned upon compliance with provisions of the Storage Tank and Spill Prevention Act of 1989, all applicable regulations, and with the requirements for obtaining and maintaining a permit required under this Act. I certify my responsibility for assuring the following permit requirements:

- Storage tank systems are in compliance with applicable administrative, technical and operational requirements as specified in Subchapter E for underground tanks or Subchapter F or G for aboveground tanks.
- Tank handling and inspection activities are performed by an individual possessing DEP certification in the appropriate category as required in Subchapters A and B.
- Underground storage tanks meet the applicable financial responsibility requirements of Subchapter H (relating to financial responsibility requirements).
- A Spill Prevention Response (SPR) Plan must be submitted to the appropriate DEP regional office for facilities that have aboveground storage tanks where the total capacity of all aboveground tanks is greater than 21,000 gallons.
- Other state and local permits required for operation of the tank system have been attained.

My signature represents to the Department that I own the storage tank(s) and am aware of the responsibilities and potential liabilities as an "owner" arising under the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I am also advised that statements made on this registration is made subject to the penalties of 18 PA. C.S.A. Section 4904 relating to unsworn falsification to authorities.

Type or Print Owner Name James A Keeler

Owner Signature	Title	Date
	VP and Site General Manager	7/3/13

Information & Invoices should be sent to:

- ☐ Tank Owner Contact
- ☒ Site Contact
- ☐ Facility Operator
- ☐ Other Responsible Party Identified Below

Organization Name or Registered Fictitious Name		Employer ID# (EIN)		Dun & Bradstreet ID#
Philadelphia Energy Solutions Refining and Marketing LLC		61-1689574		078625328
Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**
Additional Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**
Mailing Address Line 1	**Mailing Address Line 2**			
3144 Passyunk Ave				
Address Last Line – City		**State**	**ZIP+4**	**Country**
Philadelphia		PA	19145-5299	USA
Client to Site (Facility) Relationship				
OWNOP				

X. INSTALLER / REMOVER CERTIFICATION

This section must be completed by the certified tank handler(s) who is responsible for the installation or removal from service of the aboveground and underground storage tank systems listed in Section VI. Tank modification activity must be submitted on a "Tank Modification Report" form.

SIGNATURE & CERTIFICATION OF INSTALLER(S) / REMOVER(S)

As the certified tank handler responsible for the tank handling activities in the category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I also certify, under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided therein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Installer/Remover Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Installer/Remover Signature	Date
086A	Vance Davis	API 653	5506	AFMX	1701	Vance Davis	6-26-13

XI. INSPECTOR CERTIFICATION

This section must be completed by the DEP Certified Tank Inspector(s) who is responsible for verifying the installation standards for field constructed tanks and aboveground tanks greater than 21,000 gallons listed in Section VI. (Type or Print legibly) A DEP Certified Inspector may also be responsible for inspecting existing ASTs which are entering regulated service for the first time with no tank handling activities.

SIGNATURE & CERTIFICATION OF INSPECTOR(S)

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications; that the tank(s) have been tested as required by industry standards; and that the tank(s) meet or exceed applicable design and operating standards; and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1989, and all applicable regulations. I also certify under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Inspector Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Inspector Signature	Date
086A	Russell Davis	API 653	3624	IAF IAm	1034		7/1/13

XII. SITE SPECIFIC INSTALLATION PERMIT NUMBER

If a site-specific permit was required for a new tank installation, write the tank number(s) and permit number(s) in the appropriate box.

Site-Specific Installation Permit	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#

FedEx Express **US Airbill**

FedEx Tracking Number: 8606 7914 3507

Sender's Copy

From *Please print and press hard.*

Date: 7-3-13 Sender's FedEx Account Number: 4841-0516-2

Sender's Name: C. Barksdale Phone: (215) 339-2000

Company: Philadelphia Energy Solutions

Address: 3144 Passyunk Ave Dept./Floor/Suite/Room:

City: Philadelphia State: PA ZIP: 19145

Your Internal Billing Reference First 24 characters will appear on invoice. TK068A

To

Recipient's Name: Div of Storage Tanks Phone: (800) 427-2657

Company: PA DEP

Recipient's Address: Rachel Carson State Office Building Dept./Floor/Suite/Room:

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address: 400 Market St

To request a package be held at a specific FedEx location, print FedEx address here.

City: Harrisburg State: PA ZIP: 19101

*Delivered Friday, July 5, 2013 9:07AM
Signed by C. Outlaw

Find drop-off locations at fedex.com
Simplify your shipping. Manage your account. Access all the tools you need.

4a Express Package Service

Packages up to 150 lbs.

- ☐ FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☒ FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- ☐ FedEx First Overnight — Earliest next business morning delivery to select locations.* Saturday Delivery NOT available.
- ☐ FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

FedEx Envelope rate not available. Minimum charge: One-pound rate.

* To most locations.

4b Express Freight Service

Packages over 150 lbs.

- ☐ FedEx 1Day Freight* — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

* Call for Confirmation:

** To most locations.

5 Packaging

- ☒ FedEx Envelope*
- ☐ FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- ☐ FedEx Box
- ☐ FedEx Tube
- ☐ Other

* Declared value limit $500.

6 Special Handling

Include FedEx address in Section 3

- ☐ **SATURDAY Delivery** — NOT Available for FedEx Standard Overnight, FedEx First Overnight, FedEx Express Saver, or FedEx 3Day Freight.
- ☐ **HOLD Weekday at FedEx Location** — NOT Available for FedEx First Overnight.
- ☐ **HOLD Saturday at FedEx Location** — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- ☒ No
- ☐ Yes — As per attached Shipper's Declaration.
- ☐ Yes — Shipper's Declaration not required.
- ☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

☐ Cargo Aircraft Only

7 Payment *Bill to:*

Enter FedEx Acct. No. or Credit Card No. below.

- ☒ Sender — Acct. No. in Section 1 will be billed.
- ☐ Recipient
- ☐ Third Party
- ☐ Credit Card
- ☐ Cash/Check

FedEx Acct. No. or Credit Card No.: Exp. Date:

Total Packages	Total Weight	Total Declared Value†	FedEx Use Only
1		$ .00	

†Our liability is limited to $100 unless you declare a higher value. See back for details. By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

8 *NEW* Residential Delivery Signature Options

If you require a signature, check Direct or Indirect.

- ☐ No Signature Required — Package may be left without obtaining a signature for delivery.
- ☐ Direct Signature — Anyone at recipient's address may sign for delivery. *Fee applies.*
- ☐ Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. *Fee applies.*

520

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2630-FM-BECB0150 Rev. 3/2013
FORM

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

ABOVEGROUND STORAGE TANK INTEGRITY INSPECTION SUMMARY

I. Type of Inspection
- ☐ In-service
- ☒ Out-of-service

II. Inspection Date(s)
Completion of this inspection 8/9/2013
Last in-service inspection 4/3/2006
Last out-of-service inspection _____

FOR DEP USE ONLY
Reviewer _____
Date _____
Entered By _____
Date _____

III. Facility Information
Facility I.D. Number 51-33620
Facility Name Philadelphia Energy Solutions
Facility Address 3144 W. Passyunk Ave.
Philadelphia, PA 19145
Municipality Philadelphia

IV. Inspector Information
Name Russell Boutin
Certification number 3624
Phone 570-586-3944
Employer Mott Tank Inspection, Inc.
Employer certification number 1034

V. Tank Identification
DEP Tank ID number new A Owner's Tank ID Number PB843
Nominal Capacity (**gallons**) 6346200
Size: diameter 150 (ft) length/height 49 (ft)
Substance stored Empty (Crude Oil)
Original construction code API 12C

VI. Fire/Safety Permit
Number Unknown
Issuing Authority _____
Date Issued _____

- ☐ Horizontal Saddle Tank
- ☒ Vertical Tank
- ☐ Elevated Vertical Tank
- ☐ Shop Built
- ☒ Field Built

VII. Certified Inspector
I, the DEP Certified Inspector, have inspected the entire above referenced tank system. Based on my observation of the tank system, review of examination and tests results and information provided by the owner, I certify under penalty of law as provided in 18 Pa. C.S.A. Section 4904 (relating to unsworn falsification to authorities), that the information provided by me is true, accurate, and complete to the best of my knowledge and belief. I also certify that this tank system ☒ **can** ☐ **cannot** remain in service or be returned to service without additional evaluation or modification.

Certified Inspector's Signature — Date: 8/9/13

VIII. Owner or Owner's Representative I have reviewed the completed inspection report. I certify under penalty of law as provided in 18 PA C.S.A. Section 4904 (relating to unsworn falsification to authorities), the information provided by me is true, accurate, and complete to the best of my knowledge and belief.

GEORGE GAYNOR — Name (Please Print)
LEAD TANK ENGINEER — Title
215-339-7345 — Phone Number

George Gaynor — Signature
8/12/2013 — Date

Facility ID 51 — 33620 **DEP Tank ID** new A **Inspection Date** 8/9/2013

IX. Evaluation of Tank System Indicate the condition of the following components by marking the appropriate columns. If unsatisfactory explain deficiency in comment section.

System component	Satisfactory	Unsatisfactory Tank Cannot be Returned to Service	Not Applicable
Foundation and tank supports	☒	☐	
Tank shell	☒	☐	
Tank roof	☒	☐	
Tank bottom/floor	☒	☐	☐
Internal linings & coating, if installed	☒	☐	☐

Method(s) used for nondestructive examination(s) Visual, UT measurements

	Satisfactory	Unsatisfactory	Tank Cannot be returned to service	Not Applicable
External deterioration protection	☒	☐		
Appurtenances	☒	☐	☐	
Ancillary equipment (including piping)	☒	☐	☐	
Cathodic protection system, if installed	☐	☐	☐	☒

X. Calculated Information

1. Corrosion/deterioration rate: Tank Shell 0.00055 (in/yr)
   Tank Bottom new (in/yr)
   Piping 0.00200 (in/yr)
3. Service life based on corrosion rate:
   Tank 40 (years)
   Piping 125 (years)

Which method did you use to calculate the tank bottom service life?: ☒ API-653 ☐ Corrosion Rate

What was the retirement thickness for the calculation? (T-min or other endpoint) 0.288 inch (fifth course)

2. Next inspection scheduled by:
   In-service 08/09/2018 (mm/dd/yy) ☐ Next Inspection Dates to be Determined after
   Out-of-service 08/09/2023 (mm/dd/yy) Repairs and before tank is returned to service

XI. Observations

1. Contamination observed/suspected: ☒ No ☐ Yes, Department notification form submitted on _____.
2. Does the tank have any perforations? ☒ No ☐ Yes
3. Is the tank system appropriately labeled? ☒ Yes ☐ No

XII. Record Review

1. Written operations and maintenance plan available on site: ☒ Yes ☐ No
2. Spill Prevention Response Plan is current and available on site: ☒ Yes ☐ No ☐ Not required
3. Owner/Operator monthly maintenance inspection record is available for the past twelve months: ☒ Yes ☐ No
4. Is this tank internally lined? ☒ Yes ☐ No ☐ No record available
5. Is a leak test required at the time of this inspection? ☐ Yes ☒ No

   If so, did the test indicate a possible leak? ☐ Yes ☐ No What method was used? _____

Facility ID 51 — 33620 **DEP Tank ID** new A **Inspection Date** 8/9/2013

XIII. Tank Information

(1) Tank Construction
- ☒ A Single wall steel
- ☐ D Double wall steel
- ☐ E Single wall fiberglass
- ☐ F Double wall fiberglass
- ☐ R Single wall molded plastic
- ☐ S Single wall stainless steel
- ☐ 99 Other _____

(3) Aboveground Piping Construction
- ☒ A Steel
- ☐ D Fiberglass
- ☐ F PVC or Plastic
- ☐ L Stainless Steel
- ☐ 99 Other _____

(5) Pipe Release Detection Method
- ☒ G Visual inspection
- ☐ H None
- ☐ 99 Other _____

(7) Overfill Prevention
- ☒ Y Yes
- ☐ N No

(10) Tank Cathodic Protection
- ☐ B Galvanic
- ☐ C Impressed current
- ☒ N None

(16) Emergency Containment
- ☒ Meets permeability requirement
- ☒ Verified by a Registered Professional Engineer
- ☐ Containment present but does not meet requirements
- ☐ No containment structure
- ☐ Outer wall of a double walled tank

(17) Secondary Containment
- ☐ Impermeable layer: _____
- ☒ Space for release detection: double bottom
- ☐ N None

(24) Normal Vent / Emergency Vent
- ☒ S Satisfactory
- ☐ U Unsatisfactory

XIV. Double Walled Tanks

If this is a double walled tank that relies **solely** on the outer wall for containment, please answer the following questions.

Is there spill prevention (Spill Bucket/Containment Box)? ☐ Yes ☐ No

Are there block valves on all product lines? ☐ Yes ☐ No

Is there a solenoid valve or antisiphon device? ☐ Yes ☐ No ☐ Not applicable

XV. Comments

Describe any tank system deficiencies and note additional information discovered during the inspection. If additional comment sheets are needed, label each sheet with facility and tank identification numbers, inspection date and page number.

No tank system deficiences were discovered during the inspection.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP & BROWNFIELDS

August 13, 2013

Phila Energy Solutions Refining & Marketing LLC
Attn: James Keeler
3144 Passyunk Ave
Philadelphia, PA 19145-5299

RE: Phila Ref Point Breeze Proc Area
3144 Passyunk Ave
Philadelphia, PA 19145

Facility No.: 51-33620 Tank No(s): 086A

Dear Storage Tank Owner:

This letter verifies that we have received your registration form for the new tank(s) noted above. After the form is processed, you will receive an invoice for the registration fees due.

For the tank(s) noted above, this letter serves as a ninety (90) day proof of temporary registration and notification to your product distributor(s).

This temporary registration expires on November 13, 2013 or upon receipt of an official certificate of registration.

Post this letter in a protected area visible to the public at the facility where the tank(s) is located.

This temporary registration may be revoked if the owner or operator fails to make prompt payment of the registration fees. To assist in tank registration verification, please provide a photocopy of this letter to your product distributor(s).

In a few weeks, you will receive an invoice for the registration fees due for the regulated tank(s) at your facility. The invoice will be prorated to get the new tank(s) into your facility's annual invoicing cycle. Payment is due on receipt of the invoice.

Once your invoice stub and payment is received and processed, the appropriate certificate will be generated. This will allow the new tank(s) to be operated through the end of the annual invoicing cycle. Please allow four to six weeks for processing.

Information on the requirements for the operation and maintenance of storage tanks is available on the Storage Tank web page at www.state.pa.us, Keyword: "DEP Storage Tanks," or from the Southeast Regional Office, phone number 484.250.5900.

If you have any questions or need further assistance please contact me, or Customer Service, at the number below.

Sincerely,

Sharon Peterson

Sharon Peterson
Division of Storage Tanks

Cc: Regional Office
Facility File

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

August 13, 2013

Mr. James Keeler
Philadelphia Energy Solutions Refining and Marketing LLC
3144 Passyunk Avenue
Philadelphia, PA 19145-5299

RE: SSIP Application 13011 for 1 AST – Facility 51-33620

Dear Mr. Keeler:

DEP has completed its technical review of your application for a Site Specific Installation Permit (SSIP) for the installation of one (1) aboveground storage tank at Philadelphia Energy Solutions Refining and Marketing LLC, City of Philadelphia. Enclosed please find the approved SSIP #13-51-019. This permit should be kept on site and made available for inspection by DEP staff or DEP certified installers or inspectors.

Before placing product in the storage tank, an Operating Permit must be obtained by submitting a properly completed Storage Tanks Registration/Permitting Application form (2630-PM-BECB0514). The form must be signed by a DEP certified installer/inspector. DEP will notify the applicant when the tank is registered and the Operating Permit is issued.

Please note that the issuance of this Site Specific Installation Permit does not constitute the issuance of other DEP permits that may be necessary for this project. Ensure that all other required permits are in place prior to commencement of the project.

If you have any questions regarding issuance of your permit, please contact Mr. Eric Lingle at the number below.

Sincerely,

Charles M Swokel

Charles M. Swokel, Chief
Division of Storage Tanks

Enclosure

Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Environmental Cleanup and Brownfields
Division of Storage Tanks

STORAGE TANK SITE SPECIFIC INSTALLATION PERMIT

PERMITTEE (Name and Address)
Philadelphia Energy Solutions Refining and Marketing LLC
3144 Passyunk Avenue
Philadelphia, PA 19145-5299
Attn: Mr. James Keeler

PERMIT NO. *13-51-019*
Name: *Philadelphia Energy Solutions Refining and Marketing LLC*
County: *Philadelphia*
Municipality: *City of Philadelphia*
Facility ID: *51-33620*

AUTHORIZATION

The Commonwealth of Pennsylvania, Department of Environmental Protection ("DEP"), hereby issues this Site Specific Installation Permit to the above-named Permittee and Facility, for the tanks:

One AST storing Crude Oil *Capacity: 6,346,200 gallons*

The Department issues this Permit pursuant to authority granted it in the Storage Tank and Spill Prevention Act, The Act of July 6, 1989, P.L. 169, *as amended*, 35 P.S.§ 6021.101 *et seq.* ("Storage Tank Act").

The Permittee is required to follow all requirements imposed by the Storage Tank Act, 35 P.S. § 6021.101 *et seq.*, the Storage Tank regulations, 25 Pa. Code. Chapter 245, and other statutes and regulations administered and enforced by the Department. The installation of new tanks must be completed by a DEP certified installer. The Permittee must also register the tanks and receive an operating permit prior to operating the tanks described above.

This Permit is issued pursuant to the application filed by the Permittee. All maps, reports, assessments and supporting documents submitted as part of the application process are incorporated by reference into, and become enforceable with this Permit. The Permittee may not deviate from the information set forth in the application for this Permit, without first obtaining the written approval of the Department.

This Permit is subject to the following Special Condition: None

PERMIT ISSUED
Date 8/13/2013

DEPARTMENT OF ENVIRONMENTAL PROTECTION
By: Charles M Swokel

Charles M. Swokel, Chief
Division of Storage Tanks

APPENDIX I

Field Procedures

APPENDIX I
FIELD PROCEDURES
AOI 4 REMEDIAL INVESTIGATIVE REPORT
PHILADELPHIA ENERGY SOLUTIONS FACILITY
PHILADELPHIA, PENNSYLVANIA

I.1. LIQUID LEVEL ACQUISITION

Responsible Personnel: Technicians and Geologists

Training Qualifications:

All field personnel involved in liquid level acquisition shall have, as a minimum, completed OSHA 40 HOUR HAZWOPER training, PSM training, and obtained a TWIC Card as well as completing the 3-day minimum field training requirements as specified within the Corporate Health and Safety Plan. Prior to solo performance of liquid levels, all field personnel will have performed a minimum of three site visits under the direct supervision of experienced personnel.

Health and Safety Requirements:

Personal Protective Equipment (PPE) Required:

Level D attire including steel toe/steel shank boots, NOMEX coveralls, and an H2S meter are required to be worn. Based on site conditions, Level C attire may be required. The PPE required to upgrade to Level C may include: nitrile gloves, disposable outerboots, Tyvek coveralls, and a respirator. Safety glasses or hard hats may also be required in certain areas.

Site Controls:

Safety cones and or caution tape should be used in high traffic areas. The "Buddy System" may also be employed in high traffic areas.

Potential Hazards:

Traffic, pinch and trip, chemical (airborne and physical contact) and biological are all likely hazards to be encountered on-site. Additional hazards are mentioned in the site-specific HASP.

Materials and Equipment Necessary for Task Completion:

Electronic oil/water interface probe or conductivity water line, decontamination supplies (liquinox, deionized-distilled water, appropriate containers, scrub brush, and sorbent pads or paper towels), and air monitoring instruments (optional, based on previous site visits).

Methodology:

The task involves the deployment of a liquid sensing probe into a well (in most cases), recording the reading, and decontaminating the probe. The recorded field readings can then be utilized for one of several applications including: well sampling, water table gradient mapping, separate-phase hydrocarbon occurrence, thickness, and or gradient mapping, and various testing procedures.

The proper procedure for liquid level acquisition from a well is as follows:

1) The wells should be gauged in order of least to most contaminated based on existing sampling data or separate-phase hydrocarbon occurrence.
2) The gauging instrument is decontaminated prior to initial deployment and after each well to prevent cross contamination between wells.
3) Decontamination procedures include the following steps:
    a) Remove gross contaminants with sorbent pad or towel.
    b) Rinse/scrub equipment with water.
    c) Scrub equipment in Liquinox®/deionized-distilled water solution.
    d) Double rinse with deionized-distilled water.
    e) Air dry.
4) The well(s) to be gauged may need to be marked off with safety cones and or caution tape in order to protect personnel from auto traffic; the "Buddy System" may also be employed.
5) The manhole cover is then lifted off of the well head. A pry bar may be needed to prevent personal injury in the case of large manhole covers.
6) The probe is lowered into the well until the instrument signals contact with liquid.
7) The corresponding reading is recorded when the instrument signals either water or product. A clear bailer may be used to verify the existence or approximate amount and appearance of product.

8) The probe is then retracted from the well and decontaminated accordingly.

9) The well is then secured appropriately.

10) Note the start and stop time for gauging round in the field book.

I.2. GROUNDWATER MONITORING PROCEDURES

Responsible Personnel: Technicians and Geologists

Health and Safety Requirements:

Site specific HASP must be completed and reviewed by field personnel. Ambient air monitoring will be performed quarterly at all treatment areas to determine the necessity of PPE upgrade. As a minimum, level "D" attire will be worn.

Training Qualifications:

All field personnel involved in groundwater monitoring shall have, as a minimum completed OSHA 40 HOUR HAZWOPER training and completed the 3 day minimum field training requirements. Prior to groundwater monitoring, all field personnel will have sampled a minimum of three sites under the direct supervision of experienced personnel. Field personnel will also have experience in vapor monitoring techniques and sampling equipment decontamination.

Materials and Equipment Necessary for Task Completion:

A list of equipment required to access, gauge, purge, and sample site monitoring wells is presented below. Also listed are materials necessary to store, label, preserve, and transport groundwater samples.

- Current site map detailing well locations;
- Field data book for recording site data;
- Liquid level gauging device (graduated, optical interface probe);
- Keys and tools to provide well access;
- Appropriate sample containers and labels: volatile samples will be collected in laboratory provided 40 milliliter (ml) glass vials with plastic caps fitted with Teflon ® lined septa; all sample bottles will be laboratory sterilized and will contain the appropriate preservative, if applicable;

- Appropriate well purging apparatus as determined by volume of groundwater to be purged and compounds to be analyzed;
- Teflon ® (or equivalent) bottom-loading bailer to extract groundwater sample;
- Clean nylon or polypropylene bailer cord;
- Disposable nitrile sampling gloves;
- Decontamination supplies;
- Calibrated five-gallon bucket and watch or stopwatch to determine discharge rate during purging;
- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

Methodology for Three Well Volume Sampling:

Prior to actual site visitation for the groundwater sampling event, the following data will be reviewed to ensure proper preparation for field activities:

- Most recent liquid level data from all wells;
- Most recent analytical data from all wells to determine gauging and sampling sequence; and
- Well construction characteristics.

Each monitoring well to be sampled will be gauged to obtain liquid level data immediately prior to initiation of the sampling process. Refer to Liquid Level Gauging SOP for appropriate well gauging procedures. Liquid level data will be recorded in a field book. Should free-phase petroleum product be detected by the gauging process and verified through inspection in a pre-cleaned acrylic bailer, groundwater sampling will not be conducted at that location.

The sampling procedure will be initiated by purging from the well a minimum of three well volumes, except in cases where the well is pumped dry, as referenced below. Well purging is performed to remove stagnant water and to draw representative water from the aquifer into the well for subsequent sampling and analysis for the established parameters. In extreme cases where a well is pumped dry and/or shows little recharge capacity, the well will be evacuated once prior to sample procurement. Well volume calculations will be based on total

well depth as determined during well installation and depth-to-water measurements obtained immediately prior to sampling.

Down-hole pre-purge, post-purge, and sampling water quality readings will be collected. The parameters to be monitored and recorded will include dissolved oxygen, turbidity, pH, specific conductance, redox potential, and temperature.

Well purging can be performed with various equipment including: a dedicated bailer for hand bailing low volumes of water; a surface mounted electric centrifugal pump with dedicated polyethylene tubing; and/or submersible pump (when the depth to water is greater than 20 feet) with dedicated polyethylene tubing. During pumping, the intake will be placed directly below the static water surface and slowly lowered during the purging process. This procedure may not prove necessary in low-yielding wells but is important in high-yielding, permeable strata where an intake initially placed deep in a well may draw laterally and have little influence in exchanging water from shallower depths within the well bore.

Flow rate during well purging will be approximated by the bucket and stop watch method. The duration of pumping required to remove three well volumes will be calculated directly from this flow rate. All fluids removed during purging will be treated on-site with activated carbon.

The sequence of obtaining site groundwater samples will be based upon available historical site data for existing wells and soil organic vapor analyzer (OVA) readings for newly installed wells. Site wells will be sampled in order from the lowest to highest concentration of water quality indicator parameters based upon the most recent available set of laboratory analyses to reduce the potential for sample cross-contamination. Groundwater samples will not be obtained for analysis from any well containing measurable free product.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells.

1) Establish a clean work area where sampling equipment will not come in contact with the ground or any potentially contaminated surfaces.
2) Use a laboratory, pre-cleaned Teflon® sampling bailer for each well.
3) Use a clean pair of nitrile gloves.

4) Attach an appropriate length of unused, clean nylon or polypropylene cord to the designated sampling bailer.

5) Select appropriate laboratory-sterilized sample containers.

6) Slowly lower sampling bailer into well until water surface is encountered; continue to lower the sampling bailer into the standing water column to one foot below the water surface.

7) Retrieve bailer at a steady rate to avoid excess agitation.

8) Visually inspect bailed sample to ensure that no free product or organic detritus has been collected.

9) Uncap first designated sample vial and fill from bailer as rapidly as possible but minimizing agitation; secure septum and lid.

10) Inspect sealed sample for entrapped air; if air is present within sample vial. Remove lid and repeat vial filling, sealing and inspection process until no air is present.

11) Repeat Steps 9 and 10 for the second designated vial; all volatile parameter samples will be collected in duplicate.

12) Complete and attach labels to sample containers noting sample collector, date, time, and location of sample; record same data in field book.

13) Place samples in ice-filled cooler in such a manner as to avoid breakage. Samples collected for VOC analysis will be maintained at a temperature of 4°C.

Discard gloves and bailer cord and move to next sample location.

Methodology for Low-Flow Purging and Sampling:

For wells that will be Low-Flow purged and sampled, the USEPA Region III Bulletin QAD023: *Procedure for Low-Flow Purging and Sampling of Groundwater Monitoring Wells* will be followed. The following data will be reviewed for each well in order to set the pump intake for the low flow sampling:

- Soil boring (lithologic) log and continuous soil sample PID;
- Well construction log showing the screened interval;
- Identification of the most permeable zone screened by the well;
- Approximate depth to static water;
- Proposed pump intake setting; and

- Technical rationale for the pump intake setting, preferably across from the most impacted/contaminated subsurface interval.

Equipment

Adjustable rate, submersible, bladder pumps in conjunction with Teflon® or Teflon-lined polyethylene tubing for purging and sampling will be used. An alternate set up would include a stainless steel submersible Hurricane Pump with Teflon-lined tubing. The tubing diameter will be between 3/16-inch to ½-inch inner diameter and the length of the tubing extended outside the well will be minimized. Flow through cells will be used to evaluate parameters during sampling. Monitoring well information, equipment specifications, water level measurements, parameter readings, and other pertinent information will be recorded during monitoring well purging and sampling.

Sampling Procedure

The following protocol details the low-flow sampling procedure that will be used for sampling the monitoring wells.

1. PID Screening of Well. A PID measurement will be collected at the rim of the well immediately after the well cap will be removed and recorded on the sampling form.
2. Depth to Water Measurement. A depth to water measurement will be collected and recorded. To avoid disturbing accumulated sediment and to prevent the inadvertent mixing of stagnant water, measuring the total depth of the well will be done at the completion of sampling on an annual basis.
3. Low Stress Purging Startup. Water pumping will commence at a rate of 100 to 400 milliliters per minute (mL/min). This pumping should cause very little drawdown in the well (less than 0.2-0.3 feet) and the water level should stabilize. Water level measurements are made continuously and will be recorded in milliliters per minute on the sampling form.
4. Low Stress Purging and Sampling. The water level and pumping rate will be monitored and recorded every five minutes during purging, and any pumping rate adjustments will be recorded. During the early phase of purging, emphasis will be placed on minimizing and stabilizing pumping stress, and recording any necessary adjustments. Adjustments, when necessary, will be made in the first 15 minutes of purging. If necessary, pumping rates will be reduced to the minimum capabilities of the pump to avoid well dewatering. If the minimal drawdown exceeds 0.3 feet, but the water level stabilizes above the pump intake setting, purging will continue until indicator field parameters stabilized, as detailed in Step 5

below. If the water level drops below the pump intake setting at the absolute minimum purge rate, the pump will remain in place and the water level will be allowed to recover repeatedly until there will be sufficient water volume in the well to permit the collection of samples.

5. Indicator Field Parameters Monitoring. During well purging, indicator field parameters (DO, turbidity, pH, specific conductance, and redox potential) will be monitored every five minutes (or less frequently, if appropriate). Purging will be considered complete and sampling began when all the aforementioned indicator field parameters had stabilized. Stabilization will be achieved when three consecutive readings, taken at five (5) minute intervals (or less frequently, if appropriate), are within the following limits:

    - DO (±10 percent);
    - turbidity (±10 percent);
    - specific conductance (±3 percent);
    - pH (± 0.1 unit); and
    - redox potential [Eh] ±10 mv).

    Temperature and depth to water will be also monitored during purging. Should any of the parameter-reading components of the flow-through meter fail during sampling; the sampling team will attempt to locate a replacement flow-through meter. If none is available, the sampling team will measure that parameter with an individual criteria meter. Any other field observations relating to sample quality, such as odor, foaming, effervescence, and sheens, will also be recorded on the sampling form.

6. Collection of Ground Water Samples. Water samples for laboratory analyses will be collected before the groundwater had passed through the flow-through cell by either using a by-pass assembly or by temporarily disconnecting the flow-through cell. All sample containers will be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. During purging and sampling, the tubing remains filled with water in order to minimize possible changes in water chemistry upon contact with the atmosphere. Methods employed to ensure that the outlet tubing will be filled include (i) adjusting the tubing angle upward to completely fill the tubing and (ii) restricting the diameter of the tubing near the outlet of the tubing.

The order in which samples will be collected is as follows:

- Volatile organics;
- Gas sensitive (e.g., Fe^{+2}, CH_4, H_2S/HS);
- Base/Neutrals or PAHs;
- Total Petroleum Hydrocarbons;
- Total metals;
- Dissolved metals;
- Cyanide;
- Sulfate and chloride;
- Nitrate and ammonia;
- Preserved inorganic;
- Non-preserved inorganic; and
- Bacteria.

Decontamination Requirements:

Numerous practices are employed throughout the processes of site investigation and sampling to assure the integrity of the resulting data. Of particular significance to the procedures of groundwater measurement and sampling is the limitation, whenever possible, of materials inserted into a well bore and, even more importantly, of materials transferred from well to well.

Many items can be discarded between well sampling and/or gauging locations without significantly impacting project costs. Dedicated sampling equipment which can be discarded between well sampling locations without significantly impacting project costs, will be used whenever possible to preclude decontamination requirements. Sampling equipment included in this category are Teflon ® bailers, nitrile gloves, and bailer cord. However, other investigative and sampling equipment, including such items as liquid level probes, must be reused from well to well.

The danger in multi-well equipment applications lies in the potential of cross-contamination. While the threat of cross-contamination is always present, it can be minimized through the

implementation of a consistent decontamination program during sensitive site measurement and data collection activities. The decontamination procedure is outlined below:

All site equipment used in a multi-well capacity will be decontaminated immediately prior to initial use and between each well. Standard site decontamination procedures for the optical interface probes between wells will be performed according to the following schedule:

- Initial rinse with clean tap water to remove excess residuals;
- Scrub equipment with sponge or clean, soft cloth in a distilled water/Liquinox® (or equivalent) solution; and
- Double rinse with deionized/distilled water.

Rinse water generated during decontamination procedures will be treated on-site by passing the water through a bucket filled with activated carbon prior to disposal.

I.3. SOIL SAMPLING & WELL INSTALLATION

Responsible Personnel: Geologist

Training Qualifications: All field personnel supervising drilling activities shall have completed OSHA 40-Hour training, and three days of field training. Personnel supervising the well installation shall have observed drilling procedures for a minimum of three under the direct supervision of experienced personnel. Field personnel will have experience in operating the following field equipment: interface probe and photo-ionization detector (PID). Personnel should be able to describe soils encountered during drilling for generation of well logs.

Health and Safety Requirements:

A site specific HASP must be completed and reviewed by all field personnel. Prior to deploying a rig to the site, a utility call must be made (i.e. Pennsylvania One-Call) to allow mark-out of known subsurface utilities and associated laterals proximal to the site. Site plans, if available, should be reviewed to document and avoid the location of on-site utilities. No drilling should occur on retails sites within the exclusion zone. This zone is defined as the area between the pumps, the tank field and the station building. The area is excluded from drilling activities due to the likely occurrence of subsurface petroleum distribution lines. After review of all known mapped and marked utilities, a site reconnaissance will be performed to document the location of utility meters and storm sewer drains. In addition, the location of overhead utilities must be

documented. After completing the subsurface and overhead utility review, the area to drill may be observed as clear or the location may be adjusted to a "clear" location.

Once the drilling location is established, the area must be marked with cones to alert area traffic of the work area. Other health and safety concerns include slip/trip hazards, working with heavy equipment and overhead work hazards. During drilling activities, a minimum of protective work gloves, steel toed boots, hard hats, and safety goggles must be worn.

A final health and safety requirement includes hand clearing the borehole, prior to advancing the borehole with the drill rig. To ensure the safety of workers, the borehole will be cleared by hand or air knife, to depth of 5 feet below ground surface. This will serve to clear the area of utilities, prior to drilling.

Decontamination Requirements:

All down-hole equipment must be steam cleaned prior to drilling at each boring/well location. All soil sampling equipment must be cleaned with detergent and rinsed with distilled water prior to deployment into the borehole. All well construction materials (i.e. PVC well casing, PVC well screen, sand pack, bentonite seal) should be clean and dedicated to each hole.

Methodology for Borings Outside RCRA Areas in AOI 4:

1) Borehole Advancement

During soil sampling or well installation activities, a borehole is advanced into the unconsolidated subsurface materials or bedrock via a drill rig (or similar). Various types of drilling methods could be deployed to advance the hole. A description of each drilling method is included below:

a) Hollow Stem Auger

A spiral tool form is used to move material from the subsurface to the surface. A bit at the bottom cuts into the subsurface material. Spiral augers on outside convey the material to the surface while spinning. The center of the auger is hollow like a straw when the inner drive rods and plug are removed. During drilling or formation cutting, the center is filled with rods connected to a plug at the bottom bit. Once the desired drilling depth is reached, the center plug and rods can be pulled out, leaving the hollow augers in place. The hollow augers hold the borehole to remain open for sediment sampling and well installation.

b) Air Rotary

A drill bit at the bottom of rods is used to cut into the subsurface material. Air injected into the drill rods escapes through small holes in the drill bit and conveys the drill cuttings to the surface.

c) Geoprobe®

The Geoprobe® sampling allows collection of soil by directly pushing (through hydraulic hammering) a sampling device lined with a plastic macrocore into the soil column.

d) Hand Auger

A stainless steel or aluminum hand auger will be physically advanced to the desired soil sampling depth.

2) Soil Sampling

Soil samples will be obtained for lithologic logging and laboratory analysis for chemical contaminants with one of three different sampling devices: Split barrel spoon sampler, hand auger or Geoprobe® soil sampler. For either method, the sampling devices are lowered through the hollow-stem augers or open borehole to allow sampling of the undisturbed sediments below the auger bit. Soil samples will be collected at intervals which appear to be visually impacted or from intervals which exhibit the highest deflections on the screening device (PID or similar).

a) Split barrel spoon sampler (split spoon)

The split spoon sampler will be driven into the soil column in accordance with ASTM Standard Method D1586 (Reference A6, Appendix E). Soil sampling by split barrel spoon will entail drilling a borehole with a hollow-stem auger to the desired sampling depth (standard five foot intervals). After augering to the desired depth, slowly and carefully lower the split barrel spoon sampler attached to the drill rod extension into the borehole. Drive the sampler into the soil by repeated blows from a 140 Lb. hammer with 30 inch travel. Record the blow counts required to drive the split spoon sampler each successive six inch interval. Remove sampler for borehole, split barrel open, remove soil sample utilizing a stainless steel knife to trim the top and edges of the sample and containerize sample in appropriate sample jar.

b) Geoprobe®

The geoprobe® liner is dedicated to each soil sampling interval. After retrieval of the sample, the liner may be sliced open and the soil sample can be logged and containerized in the appropriate sample jar. During shallow soil sampling from fine-grained sediments, the Geoprobe® can advance the sampler directly into the ground, without the advance of an augered borehole.

c) Hand Auger

The hand auger allows for soil from the desired interval to be collected directly by removing the soil column that is contained in the auger portion of the device. This method was often used in conjunction with hydro-excavation utility clearance procedures mandated by refinery safety procedures.

Methodology for Well Installations:

1) Well Construction

After drilling to the desired depth or the desired interval, permanent monitoring wells can be installed to allow groundwater sampling. In general, wells are constructed with slotted screen, which allows groundwater to flow into the well at the desired monitored interval and well casing, which restricts groundwater flow into the well from undesired interval. In most cases the well materials are constructed of PVC. In conditions where the shallowest groundwater interval is monitored, a single case construction monitoring well is installed. In conditions where multiple water bearing units occur and deep groundwater conditions are selected for monitoring, a double cased well is installed.

a) Single Casing Construction

The construction details of a monitoring well are determined by soil type, depth to groundwater and relative fluctuation of groundwater level. After drilling to the desired depth, a monitoring well is constructed for installation into the evacuated borehole. The well consists of a bottom cap, a length of screen and length of well casing. To determine the length of screen used, seasonal groundwater table or tidal fluctuations should be considered to allow the water table to intercept the well screen throughout the year. The assembled well is then inserted into the borehole.

The annular space between the well screen and subsurface is filled with a sand pack, which consists of clean, sorted sand. The sand pack allows water flow into the well but acts as a

filter to prevent subsurface sediments from silting in the well. The sand pack extends one to two feet above the top of well screen. Above the sand pack, a seal is installed in the annular space between the well casing and the subsurface. The seal is comprised of hydrated bentonite and prevents surface water from infiltrating the well screen. Above the well seal, the annular space is backfilled with drill cuttings or cement. A cap is placed on the top of the well to further prevent infiltration of the surface water. The top of the well is protected with either a stand-up pipe or a locking, flush mount box.

b) Double Casing Construction

In cases where multiple water bearing zones occur, a double case well is installed to allow monitoring of the deeper water bearing zones. Construction of a double cased well is similar to that of a single case well; however, to prevent groundwater infiltration from shallower water bearing zones, a second casing is installed. This type of construction requires drilling two different diameter boreholes.

During drilling through the shallower groundwater zones, large diameter augers/bits are used to create a large diameter borehole. The borehole is advanced through the shallower water bearing area which will not be monitored. An outer casing is installed to seal the deeper monitoring well from infiltration from the shallow water bearing zones. After the outer casing is installed, the borehole is advanced deeper with smaller diameter auger/bit. The outside diameter of second augers fit within the inside diameter of the outer casing. The borehole is advanced to allow monitoring of the deeper water bearing zone. Once the desired depth is obtained, a monitoring well is installed within the outer casing, using similar methods as described in the single casing construction (3a, above). The outside casing prevents shallow groundwater infiltration into the well. The inside casing prevents surface water infiltration into the well.

2) Soil Cutting Handling

Cuttings generated from drilling will be containerized or stock-piled, undercover, until appropriate disposal is determined. In the case the soils are not impacted, the cuttings may remain on-site. Impacted soils will be removed using appropriate hazardous waste handling procedures and disposed of with an approved hazardous waste handler.

3) Well Development

After installation, monitoring wells are developed to remove residual sediments within the well and annular space. Water is pumped from the well a low flow rate (to minimize turbulence within the well and associated sand pack) until groundwater flowing from the well appears relatively free of sediments.

Documentation:

All site activities should be detailed in the site investigators fieldbook. The entry shall include the date, time, weather, address, and persons present on-site. In addition, data required to create well construction logs or boring logs (if no well is constructed) should be collected. This data includes soil type, relative moisture content, depth of water table, observed impact, soil screening measurements (if PID is used), blow counts (if split spoon samples are collected), sample recovery, depth of borehole, length of well screen, length of well casing(s), sand pack interval, well seal interval. The site investigator should identify the relative location and number.

I.4. NON-AQUEOUS PHASE LIQUID (NAPL) SAMPLING PROCEDURES

Responsible Personnel: Technicians and Geologists

Training Qualifications:

All field personnel involved must have completed OSHA 40 HOUR HAZWOPER training. Prior to NAPL sampling, all field personnel will have worked a minimum of three sites under the direct supervision of experienced personnel. Field personnel will also have experience in sampling and vapor monitoring techniques and sampling equipment decontamination.

Materials and Equipment Necessary for Task Completion:

A list of equipment required to sample NAPL from a monitoring well is presented below:

- Current site map detailing well locations;
- Field data book for recording site data;
- Liquid level gauging device (graduated, optical interface probe);
- Keys and tools to provide well access;

- Appropriate sample containers and labels. NAPL samples will be collected in laboratory provided 40 milliliter (ml) glass vials with plastic caps fitted with Teflon ® lined septa; all sample bottles will be laboratory sterilized and will contain the appropriate preservative, if applicable. A minimum of 10 ml is required for laboratory analysis. In the case that sufficient volume is not obtained, a swabbing technique (described below) will be used;
- Sorbent pads (required for swabbing technique);
- Teflon ® (or equivalent) bottom-loading bailer to obtain NAPL sample;
- Clean nylon or polypropylene bailer cord;
- Decontamination supplies;
- H&S supplies (tyvek, nitrile gloves, safety goggles);
- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

Health and Safety Requirements:

Site specific HASP must be completed and reviewed by field personnel. As a minimum, modified Level "D" attire will be worn. Individuals performing NAPL sampling are required to wear safety goggles, tyvek suit, and nitrile sampling gloves.

Decontamination Requirements:

During NAPL sampling activities, dedicated sampling equipment (i.e. Teflon ® bailers, nitrile gloves, and bailer cord) are utilized; thereby, eliminating decontamination requirements. The interface probe, used to record the presence of NAPL and relative thickness prior to sampling, does require decontamination between sampling locations.
All site equipment used in a multi-well capacity will be decontaminated immediately prior to initial use and between each well. Standard site decontamination procedures for the optical interface probes between wells will be performed according to the following schedule:

- Initial rinse with clean tap water to remove excess residuals;
- Scrub equipment with sponge or clean, soft cloth in a distilled water/Liquinox® (or equivalent) solution; and
- Double rinse with deionized/distilled water.

Methodology:

Each monitoring well to be sampled will be gauged to obtain liquid level and relative NAPL thickness immediately prior to initiation of the sampling process. Refer to SOP No. 1 for appropriate well gauging procedures. Liquid level data will be recorded in a field book.

Sampling of the NAPL will occur via two different methods: direct sample or swabbing.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells.

1) Establish a clean work area where sampling equipment will not come in contact with the ground or any potentially contaminated surfaces.
2) Use a laboratory, pre-cleaned Teflon® sampling bailer for each well.
3) Don an unused, clean pair of nitrile gloves.
4) Attach an appropriate length of unused, clean nylon or polypropylene cord to the designated sampling bailer.
5) Select appropriate laboratory-sterilized sample containers.
6) Slowly lower sampling bailer into well until water surface is encountered; continue to lower the sampling bailer into the standing water column to one foot below the water surface.
7) Retrieve bailer at a steady rate to avoid excess agitation.
8) Visually inspect bailed sample to ensure for relative thickness of NAPL. If sufficient volume is present (>10 ml) place a direct sample of the NAPL into the laboratory vial. If less than 10 ml of NAPL is present, use a sorbent pad to absorb the NAPL from the surface of the groundwater sample. Place is swab sample into the laboratory vial.
9) Complete and attach labels to sample containers noting sample collector and date, time, and location of sample; record same data in field book.
10) Place samples in ice-filled cooler in such a manner as to avoid breakage. Samples collected for VOC analysis will be maintained at a temperature of 4°C.
11) Discard gloves and bailer cord and move to next sample location.

Documentation:

All site activities should be detailed in the site investigators fieldbook. The entry shall include the date, time, weather, address, persons present on-site, and the aforementioned parameters. Only relevant observations should be recorded. The nature of the work being performed is also appropriate.

APPENDIX J

Data Usability Assessment

Appendix J: Data Usability Assessment

AOI 4 – PES Facility

The purpose and objective of the data usability assessment is to determine if the specific goals of the project were achieved by evaluating the sensitivity, validity, reliability, representativeness, comparability, and completeness of the collected data. The process documents that analytical results used for decision-making are accurate, precise, and representative of environmental conditions. The Data Usability Assessment includes an examination of the reported laboratory analytical data, the supporting data, and field notes, when necessary. A review of the deficiencies identified in the data, appended data qualifiers, identification of biases and unreliable data, and assessments of field and laboratory performance are completed and reconciled with project data quality objectives. Reported results may be considered be sufficiently valid when the sampling and method performance criteria were achieved or, alternatively, the results may be considered estimates and qualified by the laboratory or data validator. In the case or organic analyses, these flags include "J" qualifiers to indicate a reported result is estimated below the laboratory reporting limit; "UJ" qualifiers to indicate estimated laboratory detection limits; and "B" qualifiers to indicate a reported result may be affected by blank contamination. For inorganic analyses, laboratory-applied "J" and "B" qualifiers are typically defined inversely.

For the purposes of this investigation, groundwater and soil results summarized in 55 laboratory reports provided by The Washington Group, Lancaster Laboratories, Pace Analytical, and Accutest Laboratories are evaluated in the sections below for usability. These samples were collected from May 2003 through July 2013 by AquaTerra Tech, Stantech, and Secor, on behalf of Sunoco, Inc. Samples were analyzed for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), ethylene dibromide (EDB), lead and wet chemistry parameters. Copies of the laboratory reports are provided in this appendix for reference. Any analytical data, data qualifiers, and QA/QC results provided in these reports were evaluated to determine the reliability and validity of the data and its appropriateness for use in the decision-making process. The criteria used in the data usability summary are presented in the following sections.

A complete list of SDGs included in the AOI 4 evaluation is as follows:

Laboratory	***Year***	***SDGs***
The Washington Group	2003	75559
Lancaster Laboratories	2004	911205, 891702, 904975, 906716, 911206
	2005	965084, 937120, 937907, 941574, 941914, 942136, 942334, 942526, 953719, 954311
	2006	1003269, 1010396, 1016432, 1003265, 1003268, 1003270, 1003263, 1016432, 1016430

Laboratory	*Year*	*SDGs*
Pace Analytical	2007	07-4139, 07-2076, 07-4095, 07-4146, 07-6851
Accutest Laboratories	2012	JB23910, JB23819
Accutest Laboratories	2013	JB30168, JB30169, JB30306, JB30309, JB30425, JB31413, JB31583, JB31733, JB31794, JB31919, JB32976, JB33050, JB33197, JB33199, JB35091, JB35319, JB33644, JB39629, JB39760, JB39854, JB40112, JB40115
Lancaster Laboratories	2013	1401329

Data Quality Indicators

Data quality indicators (DQIs) are qualitative and quantitative measures of data quality "attributes," which are descriptors used to express various properties of analytical data. Thus, DQIs are the various measures of the individual data characteristics that collectively comprise the general, all-encompassing term "data quality." Quality attributes used to assess the data usability include:

- Method selectivity/specificity
- Method sensitivity
- Accuracy (bias, validity)
- Precision (reliability)
- Representativeness
- Comparability
- Completeness

These indicators, as they relate to the data collected during the site characterization, are described in more detail below.

Method Selectivity/Specificity

Method selectivity/specificity is defined as the compound type or class that can be detected by the instrument or detector. Instruments that are used to detect a compound class (i.e., hydrocarbons) are said to be selective. Instruments that are used to detect a specific element group (e.g., halogens) are said to be specific. Groundwater and soil samples, as well as trip blanks, were analyzed for the following parameters using the listed specific methods:

- GC/MS/PID/ECD Volatile via SW-846 Method 8260B, 8021B,
- GC/MS and HPLC Semi-volatiles via SW-846 Method 8270C and SW-846 Method 8310,
- Ethylene Dibromide via SW-846 Method 8011,
- Lead by SW-846 Methods 6010B, 6010C 6020 and 6020A,

- Wet Chemistry via EPA Method 160.3, SW-846 Methods 9056A, 9215B, SM2320B-11, SM2540C-97, SM5220C-97/HACH8000, and
- SPLP Preparation by EPA Method 1312.

Method Sensitivity

Method sensitivity is the degree to which an analyte can be detected above a statistically derived method detection limit and the associated laboratory reporting limit. Method sensitivity permits decision-making when data are reported at or near state and federal benchmarks.

The following non-detect soil sample results should not be used for the purpose of demonstration of attainment because reporting limits initially exceeded screening criteria (i.e., the PADEP Soil MSCs), or samples required dilution factors that raised laboratory reporting limits above the corresponding screening criteria. Specifically, EDB associated with the SW-846 8260B volatile analysis for samples AOI4-BH-13-88_1.5-2_31413, BH-S223-080405-1.5-2, AOI4-BH-13-104_6-7_31513, AOI4-BH-13-82_6.5-7_031813, AOI4-BH-13-88_3.5-4_031413, AOI4-BH-13-96_8-9_31413, AOI4-BH-13-99_2.5-3_031813, AOI4_S-364_4-5_30413, S-364 @ 19'_031913, S-367_031313@6', AOI4_S-368_6-7_30513, S-369@32'_04022013, S-370-8-10, S-371_18-20_40113, S-372@20'_032013, AOI4-S-381_2-3_31513, and AOI4-S-373_4-6'. In addition, the 1,2-dichloroethane result for groundwater sample S-223_06_18_2013 should not be used for the demonstration of attainment because the reporting limit exceeds the MSC.

Accuracy (Bias)

Accuracy is the degree of the bias in a measurement system, and can be defined as the agreement between a measurement and an accepted reference or true value. Bias can be positive or negative, which means that the "true" concentration is likely higher or lower (respectively) than the reported laboratory result. While bias direction can be estimated for data quality impacts, the degree to which bias affects the laboratory result cannot be quantified.

Indicators of accuracy include, but are not limited to, sample hold times and preservation, surrogate spike recoveries, laboratory control sample (LCS) and LCS duplicate recoveries, and matrix spike sample (MS) and spike duplicate (SD) recoveries.. The acceptable ranges of accuracy for each of the above listed indicators are method and matrix specific, and are defined within the published analytical test methods specified in the section above. Laboratory recovery limits may differ from those identified in the methods. For the purposes of this assessment, accuracy [or bias] was evaluated by reviewing the following indicators, and deficiencies are identified in the Summary of Findings:

- *Sample hold times* to determine if samples were extracted and analyzed within method-specific timeframes. *Sample preservation* to determine that samples were properly stored on ice at 4°C ± 2°, and method-specific adjustment in pH occurred. If hold times are exceeded or preservation requirements were not met, reported concentrations may be biased low.

- *Laboratory method, equipment, and trip blank samples* to determine if sample results are potentially affected by contamination resulting from laboratory procedures, sampling equipment decontamination, or sample transport.

- *Percent recovery of surrogate spikes* (system monitoring compounds) injected into each sample prior to sample extraction or preparation to determine that these compounds were recovered within the laboratory acceptance limits. Because surrogate compounds are added to each sample at known concentrations, a measure of accuracy can be established based upon a comparison of the measured concentration to the actual amount spiked into a sample. If surrogates are recovered below this range then concentrations reported for the target analytes may be biased low: similarly, if surrogates are recovered above this range then concentrations reported for the target analytes may be biased high.

- *Percent recovery of each compound analyzed in the laboratory QA/QC samples [Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (LCSD)] and field QC samples [Matrix Spike (MS) and Matrix Spike Duplicate (SD)]*.

  LCS and LCSD samples are samples of reagent water or suitable reference matrix spiked with known concentrations of the target analytes. LCS and LCSD samples are run at a rate of one per sample batch (approximately 20 samples) and are indicators of method performance. If compounds within the LCS or LCSD are recovered above or below the acceptable ranges than concentrations of those compounds may be biased in each of the normal environmental samples within the corresponding batch.

  MS and SD samples are normal environmental samples collected at the project site and spiked with known concentrations of the target analytes. MS and SD samples are typically run at the same frequency as LCS and LCSD samples, and are indicators of potential bias based on the sampling matrix. If analytes in the MS or SD are recovered above or below the acceptable ranges, then reported results may be biased in each of the normal environmental samples within the corresponding batch.

  Internal and external instrument calibration and verification are a central part of the analytical process, and are reviewed to determine that the procedures stipulated within a particular analytical method are followed. For the purpose of this Data Usability Assessment, calibration information was not provided and not specifically reviewed unless a nonconformance was noted in the laboratory data package.

<u>Precision</u>

Precision is defined as the ability to reproduce analytical results, and is the measure of variability between individual sample measurements under prescribed conditions.

Precision is assessed by the analysis of duplicate samples and expressed in terms of relative percent difference (RPD). For this project, analytical variability was measured as the relative percent difference (RPD) between 1) analytical laboratory duplicates (LCS and LCSD), and 2) the matrix spike (MS) and matrix spike duplicate (SD). Field duplicate samples are not required under the sampling guidelines and were not collected.

Each laboratory sample delivery group listed in the section above was evaluated for precision. Generally, the LCS/LCSD and MS/SD in each of these laboratory SDGs for each parameter group [VOCs, SVOCs, metals, EDB and wet chemistry] are below the maximum allowable RPD and meet the criteria for precision. Exceptions are listed by method in the Summary of Findings.

Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The representativeness criteria may be satisfied by making certain the sampling locations are selected properly and that a sufficient number of samples are collected to fulfill program objectives.

Groundwater, soil gas and soil samples were collected from locations biased to potential source areas and/or sensitive receptors (surface water bodies, occupied buildings, and residential properties). The analytes analyzed in groundwater, soil gas. and soil samples include those currently identified in the Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E of PADEP's Closure Requirements for Underground Storage Tank Systems (with exception for the waste oil parameters since waste oil is only stored in small tanks within the facility maintenance garages).

The data collected during this investigation is considered representative of groundwater and soil in AOI 4 based on the distribution of the monitoring wells and soil boring sampling locations within the sampling program, the frequency of sample collection, and the suite of parameters analyzed.

Comparability

Comparability is the degree to which data from one study can be compared with data from other similar studies, reference values (such as background), reference materials, and screening values. This goal was achieved by using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. The sample collection methods used were based on the PADEP's guidelines summarized in the Groundwater Monitoring Guidance Manual dated December 1, 2001 and the Groundwater Sampling and Analysis Plan, dated January 17, 2008. The analytical methods used are EPA solid waste methods or Standard Methods.

Based on this data quality analysis, the data are considered comparable to other groundwater and soil data collected as part of other sampling programs.

Completeness

Completeness is defined as the percentage of usable data in the total data population generated. Completeness was calculated for each analyte where data were qualified as rejected. Completeness is determined as the difference between the total number of data points and the number of rejected data points divided by the total number of results. For soil and groundwater results associated with AOC 4, 99% percent of the data is considered complete.

Summary of Findings (by Method)

VOCs by SW-846 Method 8260B:

Multiple surrogates were reported as recovering outside of control limits for laboratory SDG 07-4139. The surrogates were not identified and the percent recoveries were not included in the data package; impacts to data quality cannot be assessed on this basis.

Samples PB-252-SUB-1 and PB-252-SUB-2 were submitted with an insufficient quantity of methanol in the medium level volatile kit to properly preserve the sample volume. The laboratory took a sample aliquot from the percent moisture jar eleven days after sample collection and analyzed for VOCs. Percent moisture jars do not contain preservative and are not zero-headspace; the reported results are not usable.

Sample 846 Sub3 displayed a surrogate recovery less than the lower control limit (i.e., 70%) for toluene-d8 at 69%. The remaining three system monitoring compounds recovered within limits. On the basis of professional judgment, there is no associated impact to data quality.

Samples AST-885-SS-6 and AST-885-SS-6 displayed recoveries less than the lower control limit for surrogate toluene-d8 at 67% and 69%, respectively. The remaining three system monitoring compounds recovered within limits. On the basis of professional judgment, there is no associated impact to data quality.

Sample 843 Line 7 displayed recoveries greater than the upper control limit for surrogates dibromofluoromethane, 1,2-dichloroethane-d4, and 4-bromofluorobenzene at 121%, 128%, and 114%, respectively. The associated sample results were non-detect; therefore, positive bias is not present in the reported results.

Sample 844 Line 10 displayed recoveries greater than the upper control limit for surrogates toluene-d8 and 4-bromofluorobenzene at 220% and 172%, respectively. The associated positive detections for benzene, ethylbenzene, isopropylbenzene, and naphthalene may be biased high.

Sample 845 Perimeter 3 displayed a recovery less than the lower control limit for surrogate 4-bromofluorobenzene at 69%. The remaining three system monitoring compounds recovered within limits. On the basis of professional judgment, there is no associated impact to data quality. In addition, sample 845 Perimeter 5 displayed surrogate recoveries less than the lower limits for dibromofluoromethane, toluene-d8,

and 4-bromofluorobenzene at 70%, 63%, and 65%, respectively. The associated positive detections and non-detect sample results may be biased low.

Samples submitted to the laboratory on September 7, 2007 were received at a cooler temperature of 14°C. The laboratory noted that ice was present in the cooler, but partially melted. The reported results for VOCs may be biased low.

Samples 848 Line 7 and 848 Sub 3 displayed surrogate recoveries greater than the upper control limit for toluene-d8 at 207% and 321%, respectively. The associated positive detections may be biased high.

The MS/SD associated with sample batch X050962AA (SDG 937907) displayed multiple recoveries and RPDs outside of the laboratory control limits. Bias and accuracy are not assessed on the basis of MS/SD recoveries and RPDs alone.

Sample 880-Surface displayed recoveries greater than the upper control limit for surrogates toluene-d8 and 4-bromofluorobenzene at 294% and 215%, respectively. The associated positive detections for benzene, toluene, ethylbenzene, isopropylbenzene, and naphthalene may be biased high.

The laboratory reported internal standard area counts outside of control limits for samples BH-S221_032505-1.5-2 BH-S224-080405-1-1.5 and S225-042805. The laboratory data packages do not indicate which internal standard did not meet acceptance criteria, nor the direction and magnitude of the failure. The impact on data quality could not be assessed.

The SD recovery of 1,2-dibromoethane associated with sample batch 05091820002B (SDG 937120) was greater than the upper control limit at 121%. In addition, multiple MS/SD RPDs were greater than the associated control limit. Accuracy and bias are not assessed on the basis of MS/SD recoveries alone.

The LCS associated with sample batch VX5793 displayed a recovery greater than the upper control limit (i.e., 134%) for 1,2-dichloroethane at 137%. The associated sample results were non-detect; therefore there is no positive bias assessed.

The laboratory duplicate sample associated with sample batch VV5757 displayed RPDs greater than the control limit for benzene and total xylenes. The sample concentrations were less than the reporting limit or non-detect; the appropriate control limit is ± the RL. The precision criteria are met for the laboratory duplicate and data usability is not impacted.

Method blank sample VI7356-MB1 displayed a positive detection for a system artifact in the volatile TIC scan at an estimated concentration of 6.7 μg/kg. Bias is not assessed on the basis of contamination associated with unidentified compounds.

MS/SD sample JB29946-4 displayed recoveries less than the lower control limit for benzene (28%/40%), 1,2-dibromoethane (27%/30%), ethylbenzene (23%/25%), toluene

(29%/31%), and total xylenes (21%/24%). The spiked sample did not originate from the Sunoco facility; bias is not assessed on this basis.
Method blank sample VX58505-MB displayed a positive detection for carbon dioxide in the volatile TIC scan at approximately 230 μg/kg. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

The MS/SD RPDs for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and total xylene associated with spiked sample JB30109-9 were greater than the upper control limits at 80%, 35%, and 38%, respectively. The spiked sample did not originate from AOI-4; analytical precision is not assessed on this basis.

MS/SD sample JB31160-55 displayed recoveries less than the lower control limit for toluene at -11% and -145%, respectively. The initial sample result was greater than 4X the spiked amount; accuracy is not assessed on this basis.

Laboratory duplicate sample JB31197-8 displayed RPDs greater than the control limit for benzene and isopropylbenzene at 123% and 200%, respectively. The appropriate control limit for isopropylbenzene is ± the RL because of the low level of detections; the duplicate meets this acceptance criteria. For benzene, the associated sample result (BH-13-43-2-2.5_030513) is considered estimated due to imprecision.

Sample S-367_0-2' displayed surrogate recoveries greater than the control limit for 1,2-dichloroethane-d4 at 131% and 139% upon analysis and reanalysis, respectively. The remaining three surrogates recovered within control limits; bias is not assessed on this basis.

Method blank sample OP64440-MB2 analyzed in conjunction with sample batch E2P941displayed a positive detection for an unknown analyte in the semi-volatile TIC scan at approximately 1,100 μg/kg. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

MS sample AOI4-BH-13-88_5.5-6_0.1413 displayed recoveries greater than the upper control limits for benzene, ethylbenzene, isopropylbenzene, toluene, 1,3,5-trimethylbenzene, and total xylenes at 139%, 145%, 150%, 144%, 144%, and 151%, respectively. Bias is not assessed on the basis of MS recoveries alone.

MS sample JB31820-2 displayed MS/SD recoveries less than the lower control limit for MTBE at -679% and -433%, respectively. In addition, the MS/SD RPD was greater than the control limit at 22%. The spiked sample did not originate from the Sunoco site; bias is not assessed on this basis.

Method blank sample VA-7269-MB displayed a positive detection for a system artifact in the volatile TIC scan at approximately 8.8 μg/kg. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

The laboratory duplicate S-366@14-16_031513 displayed a relative percent difference greater than the control limit (i.e., 15%) for benzene at 48%. The sample

concentrations were less than the reporting limit or non-detect; the appropriate control limit is ± the RL. The precision criteria are met for the laboratory duplicate and data usability is not impacted.

MS/SD sample JB39629-6 displayed recoveries less than the lower control limit for benzene, ethylbenzene, and 1,2,4-trimethylbenzene. Bias is not assessed on the basis of MS/SD recoveries alone.

Laboratory duplicate V1A5565 displayed a RPD greater than the control limit (i.e., 14%) for 1,3,5-trimethylbenzene at 14%. The associated positive detections for samples S-223_06182013, MW-4_06172013, S-234_06172013, S-243_06172013, S-243DUP_06172013, and S-239_06172013 may be affected by laboratory imprecision.

MS/SD sample JB33199-7 displayed recoveries less than the lower control limit for benzene at 20% and 24%, respectively. Bias is not assessed on the basis of MS/SD recoveries alone.

The laboratory duplicate analyzed in conjunction with SDG JB31733 displayed a RPD greater than the control limit for total xylenes at 200%. The low-level results were within ± the RL indicating acceptable precision.

Carbon dioxide was detected in the TIC scan associated with method blank sample V1A5562. TICs were not reported for the investigative samples; therefore data quality is not impacted.

The MS/SD analyzed in conjunction with SDG JB39760 displayed recoveries less than the lower control limit (i.e., 57%) for toluene at 49% and 45%, respectively. The spiked volume did not originate from AOI-4; bias is not assessed on this basis.

Method blank sample V1A5566-MB displayed a positive detection for carbon dioxide in the volatile TIC scan. TICs were not reported for the investigative samples; therefore data quality is not impacted.

MS samples JB39854-4 displayed recoveries less than the lower control limit for 1,2,4-trimethylbenzene at 48% and 50%, respectively. Bias is not assessed on the basis of MS recoveries alone.

The MS/SD analyzed in conjunction with sample batch V3B4533 displayed recoveries for benzene below the lower control limit at 6% and 15%, respectively. The spike sample did not originate from AOI-4; bias is not assessed on this basis.

EDB by SW-846 Method 8011:

MS/SD sample JB39629-9 displayed a RPD slightly greater than the control limit (i.e., 29%) at 31%. Precision is not assessed on the basis of MS/SD RPDs alone.

VOCs by SW-846 Method 8021B:

Samples 881-2, 881-3, 881-4, 881-5, 881-6, and 881-7 displayed surrogate recoveries less than the lower control limit for p-trifluorotoluene. The results reported for samples 881-2 and 881-4 may be biased low. The results for samples 881-3, 881-5, 881-6, and 881-7 are not usable because the recoveries were less than 5%.

SVOCs by SW-846 Method 8310:

The MS/SD associated with sample batch 04253SLB026 (SDG 911205) displayed recoveries of phenanthrene and benzo(a)pyrene less than the lower control limit. Accuracy and bias are not assessed on the basis of MS/SD recoveries alone.

Samples 826-1, 826-2, and 826-3 displayed surrogate recoveries of triphenylene greater than the upper control limit (i.e., 161%) at 424%, 922%, and 290%, respectively. This may indicate a positive bias in the reported results.

The MS/SD associated with sample batch 04208SLD026 (SDG 904975) displayed multiple recoveries and RPDs outside of control limits for phenanthrene, benzo(a) anthracene, benzo(b)fluoranthene, and benzo(a)pyrene. Accuracy and precision are not assessed on the basis of MS/SD recoveries or RPDs alone.

Samples 881-3, 881-5, 881-6, and 881-7 displayed recoveries greater than the upper control limit for surrogate triphenylene at 274%, 943%, 593%, and 362%, respectively. The associated positive sample results may be biased high.

Sample batch 04253820003B displayed MS/SD recoveries less than the lower control limits for phenanthrene and benzo(a)anthracene. Bias and accuracy are not assessed on the basis of MS/SD recoveries alone.

The LCS/LCSD RPD for benzo(g,h,i)perylene associated with sample batch 04222WAC026 was greater than the control limit (i.e., 30%) at 45%. The reliability of results reported in SDG 906716 may be impacted.

SVOCs by SW-846 Method 8270C/D and 8270D with SIM:

Sample AST-885-SS-4 displayed a surrogate recovery less than the lower control limit for 2-fluorobiphenyl at 51%. More than one base-neutral surrogate must be outside of control limits to warrant assessment of bias.

The MS/SD associated with sample batch 05304SLJ026 displayed recoveries greater than the upper control limit for pyrene and phenanthrene. Accuracy and precision are not assessed on the basis of MS/SD recoveries alone.

MS/SD recoveries of benzo(b)fluoranthene, benzo(a)pyrene, and benzo(g,h,i)perylene were greater than the upper control limit in sample batch 05095SLB026 (SDG 937907). Accuracy and precision are not assessed on the basis of MS/SD recoveries alone.

Method blank samples analyzed in conjunction with batches EP3064 and EZ4018 displayed multiple positive detections for system artifacts, unknowns, and aldol condensates in the TIC scan. TICs were not reported for the investigative sample results and data is not assessed for bias on the basis of contamination associated with unidentified compounds.

Matrix spike duplicate sample A015-BH-13-03_0-.5 displayed recoveries greater than the upper control limit for phananthrene and pyrene at 167% and 156%, respectively. In addition, the MS/SD RPD was greater than the control limit for anthracene, benzo(a)pyrene, benzo(a)anthrancene, benzo(b)fluoranthene, chrysene, phenanthrene, and pyrene. Bias is not assessed on the basis of MS/SD recoveries or RPDs alone.

Method blank samples analyzed in conjunction with batches E3E2102 and EF51152 displayed multiple positive detections for system artifacts, unknowns, and aldol condensates in the TIC scan. TICs were not reported for the investigative sample results and data is not assessed for bias on the basis of contamination associated with unidentified compounds.

Method blank samples analyzed in conjunction with batches E3P808, EF5118, and E3P809 displayed multiple positive detections for system artifacts, unknowns, and aldol condensates in the TIC scan. TICs were not reported for the investigative sample results and data is not assessed for bias on the basis of contamination associated with unidentified compounds.

Method blank samples analyzed in conjunction with batches E2P933 and EP3066 displayed multiple positive detections for system artifacts, unknowns, and aldol condensates in the TIC scan. TICs were not reported for the investigative sample results and data is not assessed for bias on the basis of contamination associated with unidentified compounds.

Method blank sample OP64440-MB2 analyzed in conjunction with sample batch E3P816 displayed positive detections for an unknown analyte and a system artifact in the semi-volatile TIC scan at approximately 1,200 µg/kg and 720 µg/kg, respectively. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

Sample AOI-4_S-368_6-7_30513 displayed surrogate recoveries less than the lower control limit for 2-fluorobiphenyl and terphenyl-d14 at 19% and 25A%, respectively. The associated sample results were non-detect and should be considered biased low.

Method blank sample OP64837-MB1 analyzed in conjunction with sample batch E3E2119 displayed positive detections for unknowns and system artifacts in the semi-volatile TIC scan ranging from approximately 130 µg/kg to 3,700 µg/kg, respectively. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

Method blank sample OP64837-MB1 analyzed in conjunction with sample batch E2M2182 displayed positive detections for unknowns and system artifacts in the semi-volatile TIC scan ranging from approximately 130 μg/kg to 3,900 μg/kg, respectively. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

Sample AOI4-BH-13-104_6-7_31513 displayed a surrogate recovery greater than the upper control limit (130%) for nitrobenzene-d5 at 148%. The sample was reanalyzed at a 5X dilution and the surrogates recovered within range; there is no impact to data quality.

Method blank sample OP64494-MB1 analyzed in conjunction with sample batch EZ4030 displayed positive detections for system artifacts in the semi-volatile TIC scan ranging from approximately 400 μg/kg to 1,100 μg/kg. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

Method blank sample OP64494-MB1 analyzed in conjunction with sample batch E3E2113 displayed positive detections for unknowns and system artifacts in the semi-volatile TIC scan ranging from approximately 120 μg/kg to 780 μg/kg. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

Method blank sample OP64900-MB1 analyzed in conjunction with sample batch E2M2182 displayed positive detections for an unknown and a system artifact in the semi-volatile TIC scan at approximately 190 μg/kg to 510 μg/kg, respectively. TIC reporting was not requested for the investigative sample results; there is no impact on data usability.

MS/SD sample JB31347-1 displayed RPDs greater than the control limits for anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene at 40%, 44%, 47%, 42%, 51%, and 41%, respectively. The spiked sample did not originate from the Sunoco site; precision is not assessed on this basis.

MS/SD JB33644-1 displayed recoveries less than the lower control limit for all spiked analytes. Data is not assessed on the basis of MS/SD recoveries alone.

Sample S-364_06122013 was extracted seven days outside of the preparation holding time for all semivolatile compounds except naphthalene. The reported results may be biased low.

Sample S-102_06122013 displayed a surrogate recovery for nitrobenzene-d5 less than the lower control limit (i.e., 23%) at 8%. The reported semivolatile results may be biased low.

Sample S-223_04032013 displayed slightly low recoveries for surrogates 2-fluorobiphenyl and nitrobenzene-d5 at 20% and 17%, respectively. The semivolatile sample results may be biased low.

MS/SD sample JB33197-4 displayed recoveries below the lower control limit for benzo(g,h,i)perylene at 23% and 24%, respectively. Bias is not assessed on the basis of MS/SD recoveries alone.

MS/SD sample JB33198-2 displayed recoveries outside control limits for benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluorene, naphthalene, and phenanthrene. The spiked sample did not originate from AOI-4; bias is not assessed on this basis.

Sample AOI4-BH-13-201_6-7_31813 displayed surrogate recoveries slightly less than the lower control limits for nitrobenzene-d5 (20%) and 2-fluorobiphenyl (22%). Low recoveries were confirmed through reanalysis. The reported non-detect sample results for semivolatiles may be biased low.

Sample AOI4-BH-13-101_7-8_31813 displayed surrogate recoveries less than the lower control limits for nitrobenzene-d5 (15%) and 2-fluorobiphenyl (14%). The reported non-detect sample results for semivolatiles may be biased low.

Method blank samples analyzed in conjunction with sample batches EF5145 and E3P830 displayed positive detections for system artifacts and unknowns in the semivolatile TIC scans. TICs were not reported for the investigative samples; therefore, the results are not impacted.

The MS recovery of benzo(a)pyrene associated with SDG JB35319 was greater than the control limit at 39%. In addition, the MS/SD RPD exceeded the control limit (i.e., 30%) for all semivolatiles. The spiked sample did not originate from AOI-4; bias and precision are not assessed on this basis.

Sample S-28_06132013 displayed recoveries below the lower control limit for surrogates nitrobenzene-d5 and 2-fluorobiphenyl at 10% and 19%, respectively. Low recoveries were confirmed through reanalysis; reported results for semivolatiles may be biased low.

The MS/SD sample JB39740-4 displayed RPDs greater than the control limit for multiple semivolatiles. The spiked volume did not originate from AOI-4; precision is not assessed on this basis.

MS/SD sample JB39854-5 displayed recoveries outside of control limits for benzo(a)pyrene, benzo(g,h,i)perylene, and naphthalene. Bias is not assessed on the basis of MS/SD recoveries alone.

Lead by SW-846 Method 6010B/C:

The SD associated with sample batch 050905708002 displayed a recovery less than the lower control limit at 67%. The MS recovery was within control limits; no assessment of bias is necessary.

The calibration check standard analyzed on 3/18/2013 at 11:29 displayed a recovery greater than the upper control limit at 144%. The investigative samples are not bracketed by the check standard; bias is not assessed on this basis.

The continuing calibration blank analyzed on 3/26/2013 at 13:04 displayed a positive detection at 1.6 μg/L. The associated sample results were either non-detect or greater than 10X the blank concentration; there is not impact of data usability.

The continuing calibration blank analyzed on 3/27/2013 at 10:51 displayed a negative detection at -1.7 μg/L. The associated sample results and reporting limits were greater than 10X the absolute value of the blank concentration; there is not impact of data usability.

SD sample JB31767-3 displayed a recovery greater than the upper control limit for lead at 146.5%. In addition, the MS/SD RPD was greater than the control limit (i.e., 20%) at 26.9%. The spiked sample did not originate from the Philadelphia Refinery; bias and precision are not assessed on this basis.

The serial dilution analyzed in conjunction with sample batch MP71329 displayed a percent difference greater than the control limit (i.e., 10%) at 100%. The sample concentration was less than 50X the MDL; therefore, the percent difference is acceptable.

Dissolved lead was detected in the field blank sample collected on 4/3/2013 at a concentration of 0.034 μg/L. Sample results reported for S-223_04032013 may be positively biased.

The serial dilution analyzed in conjunction with sample batch MP71239 displayed a percent difference greater than the control limit 22.1%. The sample concentration was less than 50X the MDL; therefore, the percent difference is acceptable.

The serial dilution analyzed in conjunction with SDG JB35319 displayed a percent difference greater than the control limit 11.2%. The sample concentration was less than 50X the MDL; therefore, the percent difference is acceptable.

The serial dilutions analyzed in conjunction with sample batches MP72729 and MP72759 displayed percent differences greater than the control limit 41.6% and 475%, respectively. The sample concentrations were less than 50X the MDL; therefore, the percent difference is acceptable.

Lead by SW-846 Method 6020:

The laboratory duplicate RPD associated with sample batch 051256050001A was greater than the control limit (i.e., 20%) at 25%. The reliability of results reported in conjunction with SDG 941914 may be impacted.

The laboratory duplicate RPD associated with sample batch 051256050003A was greater than the control limit at 34%. The reliability of results reported in conjunction with SDG 942136 may be impacted.

Percent Moisture by EPA Method 160.3:

Sample batches 04103471201A and 04104471201A displayed laboratory duplicate relative percent differences (RPDs) greater than the control limit at 27% and 19%, respectively. The reliability of percent moisture results associated with SDG 891702 may be impacted.

Sample batch 05220820001B displayed a laboratory duplicate RPD greater than the control limit (i.e., 15%) at 54%. The reliability of percent moisture results associated with SDG 9543111may be impacted.

Summary and Conclusions

For the purposes of this investigation, groundwater and soil results summarized in fifty-four laboratory reports, provided by The Washington Group, Lancaster Laboratories, Pace Analytical and Accutest Laboratories are evaluated in the sections below for usability. Copies of the laboratory reports are provided in this appendix for reference.

The laboratory performed quality assurance and quality control (QA/QC) analyses, including analysis of LCS/LCSDs, MS/SDs, surrogate spikes, and method blanks. Laboratory QA/QC summaries are provided in each data package, where available. The analytical data, data qualifiers, and QA/QC results provided in these reports were evaluated to determine whether AOI-4 groundwater and soil data met data quality objectives and could be used in the decision-making process.

Multiple trip blank samples were collected during the sampling events and were non-detect for target analytes. All samples were properly preserved and were extracted/prepared, and analyzed within sample hold times, with the exceptions noted above. Target compounds were not detected above the reporting limit in the laboratory method blanks with the exception of lead, and recoveries in LCS/LCSDs were within acceptable recovery control limits. Multiple surrogates and MS/SDs recovered outside of the acceptable range, and several LCS/LCSD, MS/SD, and laboratory duplicate RPDs were greater than control limits as described in detail above.

On the basis of this evaluation, the analytical laboratories appear to have followed the specified analytical methods according to the provisions of the methods, with the exception of the errors discussed above. If a given fraction or SDG is not mentioned above, that indicates that all specified criteria were met. All data are usable for characterizing the site and identifying compounds of concern with the minor exceptions noted above. As described above, non-detect sample results with reporting limits in exceedance of the associated screening level are not usable for delineating potential impacts.

APPENDIX K

Fate and Transport Analysis

APPENDIX K

FATE AND TRANSPORT MODELING PROCEDURES

AOI 4: PES FACILITY

PHILADELPHIA, PENNSYLVNIA

F.1 INTRODUCTION

Fate and transport calculations were completed for groundwater in Area of Interest (AOI) 4 to evaluate the potential migration pathway of impacted groundwater to offsite receptors. AOI 4 is located on the eastern property of the PES facility and does not border the Schuylkill River. AOI 4 is bordered by AOI 3 to the west, and AOI 1 and AOI 2 to the north. Therefore, the only potential offsite receptors for impacted groundwater are located to the east and south of the AOI 4 boundary.

Eleven compounds of concern (COCs) were detected in groundwater during the June 2013 groundwater sampling event at concentrations above their respective MSCs (Figure 10 in the AOI 4 SCR/RIR). These COCs are benzene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, 1,2,4 trimethylbenzene (1,2,4-TMB), 1,3,5 trimethylbenzene (1,3,5-TMB), tert-butyl methyl ether (MTBE), ethylbenzene, toluene, naphthalene, and lead. To address the potential future migration of these COCs, a fate and transport analysis was performed using the Quick Domenico Version 2 (QD) spreadsheet model. No groundwater to surface water discharge modeling was performed for AOI 4 as there is no potential for the impacts observed in the groundwater to be transported to the Schuylkill River or Delaware River under current hydraulic conditions. Site-specific data was used to complete the fate and transport calculations, where applicable.

F.2 QUICK DOMENICO MODEL OVERVIEW

The QD model is a Microsoft Excel spreadsheet application based on the analytical contaminant transport equation developed by P.A. Domenico in *"An Analytical Model For Multidimensional Transport of a Decaying Contaminant Species,"* Journal of Hydrology, 91 (1987), pp. 49-58. The QD model calculates contaminant concentrations

at any down-gradient location after a specified interval of time. The QD transport model incorporates the processes of advection, first order decay, retardation, and dispersion to describe fate and transport of compounds.

F.3 MODEL LIMITATIONS

Limitations of the QD model include:

- Groundwater flow is assumed to be steady state, and one-dimensional;
- Aquifer properties are assumed to be reasonably uniform;
- Applicable only to unconsolidated aquifers;
- Intended for use primarily with dissolved organic compounds;
- Does not account for the transformation of parent compounds into daughter products as the result of biodegradation;
- Compounds are considered individually, and are assumed to not react with each other; and
- The contaminant source is limited to a single and continuous source concentration.

Due to the absence of well-defined groundwater flow paths and contaminant source areas in AOI 4, the QD models generated for AOI 4 were unable to be calibrated. Hydraulic gradients throughout AOI 4 are generally flat, and small changes in groundwater elevations can cause variability in localized groundwater flow paths. Therefore, it is difficult to identify well pairs directly along persistent groundwater flow paths necessary to calibrate a fate and transport model. Also, an ideal application of the QD model would involve a well-defined dissolved plume source area, which is not characteristic of a refinery setting. Throughout AOI 4 there appears to be several small isolated dissolved plumes, but it cannot be definitively stated that the concentration of a COC in a downgradient well is attributable to a single upgradient source. Any parameters derived from calibration without definitive downgradient well pairs and source areas would introduce more uncertainty to the QD models. Therefore, it was not attempted to derive site-specific advection-dispersion or degradation parameters

through calibration. In lieu of calibrated parameters, referenced literature values were used.

F.4 SCREENING AND APPROACH TO FATE AND TRANSPORT ANALYSIS

For the purpose of fate and transport modeling, groundwater concentrations at AOI 4 are assumed to be at or near steady-state. If a well exists with COC detections below the respective groundwater MSC approximately downgradient of a location with a MSC exceedance, the COC exceeding the MSC was determined to not have potential to impact offsite receptors. Assuming steady state, the well with the COC concentrations not exceeding the MSC indicates the COC from the well in exceedance has attenuated below the respective groundwater MSC before reaching off site receptors.

Wells with compounds above the groundwater MSCs that were not delineated by down gradient wells were modeled using QD. QD simulations were constructed for wells S-366, S-364, MW-4, S-36, S-379, S-28, S-381, S-223, RW-707, RW-710, S-243, S-329, and S-224. It should be noted that there is an active total fluids recovery system located at the southern border of AOI 4 (Penrose Avenue Recovery System). The Penrose Avenue Recovery System consists of two arrays of recovery wells, RW- 700 thru RW-704, and RW-705 thru RW-717. The groundwater contours generated from the June 2013 gauging event show increased gradients and groundwater capture zones in the vicinity of the recovery system. QD models were constructed for several wells which are in close proximity or are a part of the Penrose Recovery System (S-223, RW-707, RW-710, S-243, S-329, and S-224). The groundwater impacts observed in these wells are most likely captured and treated by the recovery system. Fate and transport analysis for these wells was completed as a conservative measure to illustrate the potential for offsite migration of COCs if the Penrose recovery system was not active.

F.5 MODEL INPUT PARAMETERS

Input values for the QD and SWLOAD models were compiled from available site-specific data. When no site-specific data was available, estimated input values from the PADEP spreadsheet "Number Please!2011," which is based on PA Code, Chapter 250,

Appendix A, Table 5; or other acceptable literature sources, were utilized. The input parameters are discussed in detail in the following sections. An Excel spreadsheet interface developed by Langan was used to construct the QD simulations. This interface allowed the simulation of multiple compounds simultaneously and models to be saved in a single electronic file. Results of the QD and SWLOAD modeling can be found in Table K.1 in this appendix.

F.5.1 Source Concentration

Either the groundwater concentration from the June 2013 sampling event or an average of the 2005 and 2013 groundwater concentrations was used for the source concentrations in the QD simulations. If the 2013 concentration had decreased from the 2005 concentration, the average concentration of the two sampling events was used. If the 2013 concentration had increased, or the compound had previously not been analyzed for, the June 2013 concentration was used as the source concentration. A brief explanation for source concentrations used at each well is provided below:

- S-366 – June 2013 sampling event, first time well was sampled
- S-364 – June 2013 sampling event, first time well was sampled
- MW-4 – June 2013 sampling event, all compounds non-detect in or not analyzed in previous sampling event
- S-36 – June 2013 sampling event, first time well was sampled
- S-379 – June 2013 sampling event, first time well was sampled
- S-28 – average of the 2005 and 2103 sampling events
- S-381 – June 2013 sampling event, first time well was sampled
- S-223
    - 1,2,4-TMB – average of the 2005 and 2013 sampling events
    - 1,3,5-TMB – average of the 2005 and 2103 sampling events
    - benzene – June 2013 concentration, 2005 concentration was less than June 2013 concentration.
    - ethylbenzene – average of the 2005 and 2103 sampling events
    - toluene – average of the 2005 and 2103 sampling events

  - naphthalene – average of the 2005 and 2103 sampling events
- RW-707 – June 2013 sampling event, first time well was sampled
- RW-710 – June 2013 sampling event, first time well was sampled
- S-243 – June 2013 sampling event, first time well was sampled
- S-329 – most recent benzene concentration, decreasing trend from 2010 to 2013.
- S-224 – August 2005 sampling event, not sampled in June 2013.

F.5.2 Distance to Point of Concern (x)

The distance to the point of concern is the shortest distance between the subject well and the AOI 4 boundary. Measurements were made using the GIS developed for the site.

F.5.3 Dispersivity

Dispersivity is the tendency of a dissolved plume to "spread out" as it moves down-gradient.

- Longitudinal dispersivity (A_X) occurs in the direction parallel to groundwater flow;
- Transverse dispersivity (A_Y) occurs in the same plane as longitudinal dispersivity but perpendicular to the direction of groundwater flow; and
- Vertical dispersivity (A_Z) occurs in the upward direction, normal to the plane in which longitudinal and transverse dispersivity occur (Vertical dispersivity is usually negligible and is typically omitted from most QD analyses).

Dispersivity estimates are difficult to quantify and are commonly estimated from the following relationships:

1. $A_X = X/10$ (where, X is the distance a contaminant has traveled by advective transport)
2. $A_Y = A_X/10$

3. $A_Z = A_X/20$ to $A_X/100$ (generally, it is recommended that A_Z be a small number (0.001) unless vertical monitoring can reliably justify a larger number. Additionally, a value of 0.0001 is suggested for un-calibrated or conceptual applications).

For the AOI 4 modeling a more rigorous method was used, based on a Xu and Eckstein (1995). Using the Xu and Eckstein method a longitudinal dispersivity of 32.3 was calculated assuming a plume length of 2000 feet. A plume length of 2,000 feet was used for calculating dispersivity in the CCR Report. The Xu and Eckstein (1995) formula shown below can be found on the Environmental Protection Agency's (EPA) website:

$$A_x = 0.83\left[\log_{10}\left(L_p\right)\right]^{2.414}$$

where L_p = plume length.

As stated above the value for A_Y was estimated to be 10 percent of A_X (3.23) and a value of 0.0001 was used as a value for A_Z., assuming vertical dispersivity is negligible.

F.5.4 Lambda

Lambda is the first order decay constant. It is determined by dividing 0.693 by the half-life of the compound. The value can typically be estimated for shrinking plumes by evaluating at concentrations versus time or distance. Lambda can also sometimes be estimated for stable plumes by evaluating concentration versus time using the methodology outlined in Buscheck and Alcantar (1995). Important considerations to estimating Lambda from site data include:

1. Are the measured concentrations along the centerline of the plume?
2. Are the measured concentrations the result of the single source area?
3. Are there no remedial systems and/or activities that effected the migration of the plume during the time interval of evaluation?

If the answer is yes to these questions, the methodologies outlined in Buscheck and Alcantar may be utilized to estimate a site-specific lambda from site data.

Based on review of the available site data, as discussed above, the criteria necessary to calculate a site-specific lambda could not be met; therefore, a default value for lambda (when appropriate and available) was obtained from the PADEP spreadsheet "Number Please!2011" which is based on PA Code, Chapter 250, Appendix A, Table 5. The values listed in Number Please!2011 are aerobic decay rates. Based on a review of pH and ORP readings collected during groundwater sampling, conditions appear to range aerobic to transitional, therefore the values from the Number Please!2011 table were deemed appropriate for this evaluation. There is no lambda value reported for 1,3,5-TMB in the above referenced table. For the purposes of the fate and transport analysis, 1,3,5-TMB was assumed to have the same lambda value as 1,2,4-TMB.

F.5.5 Source Dimensions

Source width is the maximum width of the area measured perpendicular to the direction of groundwater flow. Source thickness is the thickness of the soils below the water table that contribute contamination to groundwater.

In the absence of a well-defined source, width of 100 feet was used. The source thickness was estimated as 36 feet, which is the maximum thickness of the alluvium/fill in AOI 4 (Figure 5).

F.5.6 Hydraulic Conductivity (K)

The hydraulic conductivity of a geologic material is a measure of its ability to transmit water. No aquifer testing was performed in AOI 4 for this evaluation since sufficient aquifer testing data was available from previous aquifer tests (pumping tests, recovery tests, and slug tests) performed in AOI 1 by others (SECOR, 2003; USGS, 2001; URS, 2002; Chevron USA, Inc., 1992; USGS, 1988). The hydraulic conductivity value used in AOI 4 for fate and transport modeling of

the Fill/Alluvium and Trenton Gravel (Intermediate Wells) was 24 feet/day. This value is representative of the geometric mean of hydraulic conductivity values calculated using aquifer testing recovery data in Well RW-406 (AOI 1) by SECOR in 2003 (SECOR, 2003), and appears to be most representative of the Trenton Gravel. Since the soil composition of the Trenton Gravel in AOI 4 is consistent with AOI 1, a hydraulic conductivity of 24 ft/day is believed to be representative for conditions in AOI 4.

F.5.7 Hydraulic Gradient

Hydraulic gradient is the change in hydraulic head relative to the distance between head measurement locations. The hydraulic gradient is measured parallel to the direction of ground water flow assuming horizontal flow and a uniform gradient. Site specific hydraulic gradients were derived from June 2013 groundwater elevations at all modeled locations, except wells in the vicinity of the Penrose Avenue Recovery System (S-223, RW-707, RW-710, S-243, S-329, and S-224). For these wells the hydraulic gradient (0.0035) measured in the southern portion of AOI 4 during the 2005 Site Characterization Report (SCR) was used for their QD simulations. This gradient was chosen because it represents hydraulic conditions within this area of AOI 4 prior to the installation of the Penrose Recovery System.

F.5.8 Porosity (n)

Porosity is measured as the ratio of the volume of void space in a geologic material to the total volume of material. A porosity value of 0.35 was used in the fate and transport modeling for AOI 4 based on historical geotechnical analysis of fill and alluvium materials found in the shallow aquifer zone of AOI 6. This value is appropriate for AOI 4 as the same general fill and alluvium material is present throughout the PES facility.

F.5.9 Soil Bulk Density (ρ_b)

Soil bulk density is the dry weight of a sample divided by the total volume of the sample in an undisturbed state. Soil bulk density can either be determined by a laboratory or by the equation

$$\rho_b = 2.65 * (1- n).$$

The soil bulk density values used in the fate and transport modeling is 1.7 grams per cubic centimeter as calculated using the above equation and porosity estimate of 0.35 from historical geotechnical analysis.

F.5.10 Organic Carbon Partition Coefficient (K_{OC})

The organic carbon partition coefficient is chemical specific and is provided in the PADEP EP spreadsheet "Number Please!2011" which is based on PA Code, Chapter 250, Appendix A, Table 5. These values were used in the fate and transport modeling.

F.5.11 Fraction Organic Carbon (f_{oc})

The fraction of organic carbon is the organic carbon content of a soil. A laboratory using ASTM methods can determine this value. Samples for organic carbon are taken from the same soil horizon in which the contaminant occurs, but outside of the impacted area. Since no site specific fraction of organic carbon data was available for the site, the fate and transport modeling used the model-recommended default concentration of 0.005, which is a conservative value based on the description of site soils.

F.5.12 Time (t)

'Time zero' is the point at which contamination was introduced into the aquifer. Time since 'time zero' is measured in days. The final simulation time of 1×10^{99} days was used to ensure that a steady-state plume was simulated.

F.6 QD Modeling Results

For wells located outside the influence of the Penrose Avenue Recovery System, only benzene at S-379 (19.9 ug/l) has the potential to migrate offsite. S-379 is located in the northeastern portion of AOI 4 approximately 42 feet within the eastern boundary. QD predicted a transport distance of 66.77 feet, about 25 beyond the property boundary, before benzene attenuates below the PADEP MSC of 5 ug/l. The risk of benzene exposure from this well is considered very low due to the short attenuation distance after the AOI boundary, and the absence of any potential receptors in the area.

For wells located in the vicinity, or are part of the Penrose Avenue Recovery System, all wells in this area were predicted to have impacts that could migrate offsite if the Penrose Avenue Recovery System was not operational. The wells with COCs predicted to migrate offsite are:

- RW-707 – 1,2,4-TMB, 1,3,5-TMB, benzene, MTBE
- RW-710 – 1,2,4-TMB, 1,3,5-TMB, benzene, naphthalene
- S-329 – benzene
- S-224 – benzene

The predicted migration distances for 1,2,4-TMB, 1,3,5-TMB, MTBE and naphthalene at these three wells are less than 40 feet before concentrations attenuate below their respective groundwater MSCs. The predicted migration for benzene at S-329 was less than a foot before attenuation below the groundwater MSC. However, benzene detections in the other three wells were predicted to migrate up to several hundred feet if the Penrose Avenue Recovery System was not operational. QD predicted benzene transport distances are listed below:

- RW-707 (4 feet from boundary) – 552.01 feet
- RW-710 (3 feet from boundary) – 654.97 feet
- S-224 (1 foot from boundary) – 694.28 feet

Benzene mobility, as expected, is greater than the other compounds detected this round in AOI 4. High benzene concentrations at the recovery system were also

expected; as pumping at these wells is driving the migration of LNAPL and dissolved plumes to this area. The combination of higher benzene concentrations and greater mobility contribute to the longer predicted attenuation distances. The QD predicted transport distances above provide a worst case scenario if the Penrose Recovery System was shut down. While the Penrose Recovery System is functioning, groundwater impacts in these wells are being captured as indicated by the groundwater contours in Figure 10.

Two wells with groundwater impacts, S-223 and S-243, are located just outside of the PES Facility property, at the AOI 4 boundary, but still within the capture zone of the Penrose Avenue Recovery System. The impacts at S-243, benzo(a)pyrene (1.12 ug/l), benzo(b)fluoranthene (1.29 ug/l) and benzo(g,h,i)perylene (0.85 ug/l), have very low QD predicted transport distances (less than two feet) due to the strong affinity of these compounds to sorb to aquifer materials. The farthest transport distance calculated for S-243 was 1.2 feet for benzo(b)fluoranthene. Several compounds were detected in S-223 above their respective PADEP MSCs; 1,2,4-TMB, 1,3,5-TMB, benzene, toluene, and naphthalene. All COCs in S-223 were predicted to attenuate in less than 20 feet from the well, except benzene, which is predicted to migrate about 851.90 feet. Again, while the Penrose Recovery System is functioning, groundwater at S-223 is being captured as indicated by the groundwater contours in Figure 10.

F.8 Fate and Transport Modeling Summary

Migration of COCs from AOI 4 and the potential for groundwater to impact offsite receptors is very low. The benzene concentration at S-379 (19.9 ug/l) is predicted to attenuate in less than 25 feet from the PES facility property. The QD predicted transport distances for benzene in S-223, RW-707, RW-710, and S-224 are from a worst case scenario as if the Penrose Recovery System were to be completely shut down. The Penrose Recovery System is currently active; capturing and treating the groundwater impacts observed in the wells. Although this worst case scenario predicts benzene migration off the PES facility property of several hundred feet, there would still

be no risk for groundwater to impact surface water, as the closest surface water receptor (Schuylkill or Delaware River) is at least 3,000 feet away.

Table K.1
Quick Domenico Modeling Results
AOI 4
PES Facility
Philadlephia, Pennsylvania

Location with respect to PRS[1]	Well ID	Contaminant of Concern	QD Starting Concentration	Groundwater MSC[2]	Distance to Point of Compliance[3]	QD Predicted Distance to Meet Non-Residential MSC
			ug/l	ug/l	ft	ft
Not Directly influenced by Penrose Avenue Recovery System	S-366	1,2,4-Trimethylbenzene[3]	148	62	232	1.62
		Benzene	232	5	232	180.17
	S-364	Benzene	9.8	5	72	32.89
	MW-4	Benzene	128	5	559	484.93
		Benzo(a)pyrene	2.45	0.2	559	2.20
		Benzo(b)fluoranthene	2.48	1.2	559	0.88
		Benzo(g,h,i)perylene	1.83	0.26	559	1.09
		Chrysene	2.94	1.9	559	0.72
	S-36	1,3,5-Trimethylbenzene[3]	55.5	53	556	0.28
		Benzene	288	5	556	414.11
		MTBE	21.9	20	556	9.89
	S-379	Benzene	19.9	5	42	66.77
	S-28	Benzene	28.3	5	580	456.72
	S-381	1,2,4-Trimethylbenzene[3]	1130	62	716	5.39
		1,3,5-Trimethylbenzene[3]	374	53	716	6.63
		Benzene	296	5	716	191.38
		MTBE	26	20	716	12.38
		Toluene	1770	1000	716	2.84
		Naphthalene	136	100	716	1.96
In the Vicinity of Penrose Avenue Recovery System	S-223	1,2,4-Trimethylbenzene[3]	766	62	offsite	8.95
		1,3,5-Trimethylbenzene[3]	269	53	offsite	10.77
		Benzene	7400	5	offsite	851.90
		Ethylbenzene	1005	700	offsite	9.77
		Toluene	6225	1000	offsite	18.07
		Naphthalene	295	100	offsite	13.92
	RW-707	1,2,4-Trimethylbenzene[3]	590	62	4	8.02
		1,3,5-Trimethylbenzene[3]	221	53	4	9.47
		Benzene	605	5	4	552.01
		MTBE	26.6	20	4	35.14
	RW-710	1,2,4-Trimethylbenzene[3]	1370	62	3	11.01
		1,3,5-Trimethylbenzene[3]	470	53	3	14.47
		Benzene	1440	5	3	654.97
		Ethylbenzene	768	700	3	2.50
		Naphthalene	196	100	3	8.66
	S-243	Benzo(a)pyrene	1.12	0.2	offsite	1.26
		Benzo(b)fluoranthene	1.29	1.2	offsite	0.07
		Benzo(g,h,i)perylene	0.85	0.26	offsite	0.55
	S-329	Benzene	8.6	5	67	67.74
	S-224	Benzene	2000	5	1	694.28
		Toluene	2800	5	1	10.18

NOTES:
(1) PRS = Penrose Recovery System
(2) ACT 2 TGM, Appendix A, Table 1 Medium Specific Concentration for a Non-Residential Used Aquifer with TDS less than or equal to 2,500
QD = Quick Domenico
(4) Closest distance to AOI 4 boundary
100 = Distance for COC to attanueate to screening concentrtion exceeds distance to receptor

Figure K.1
Quick Domenico
Fate and Transport Model Input and Output
S-366
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-366	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.001	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			1,2,4-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.148000
Lambda (per day)		day^{-1}	0.0123
KOC			2200
Sim 2			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.232000
Lambda (per day)		day^{-1}	0.000958904
KOC			58

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - 1,2,4-Trimethylbenzene	0.148000	0.062000	0.062000	1.617001
Sim 2 - Benzene	0.232000	0.005000	0.005000	180.170675

Figure K.1
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,2,4-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

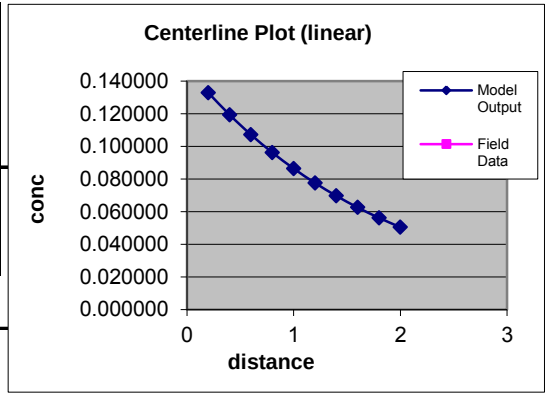
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.148000	3.23E+01	3.23E+00	1.00E-04	1.230E-02	100	36	1E+99

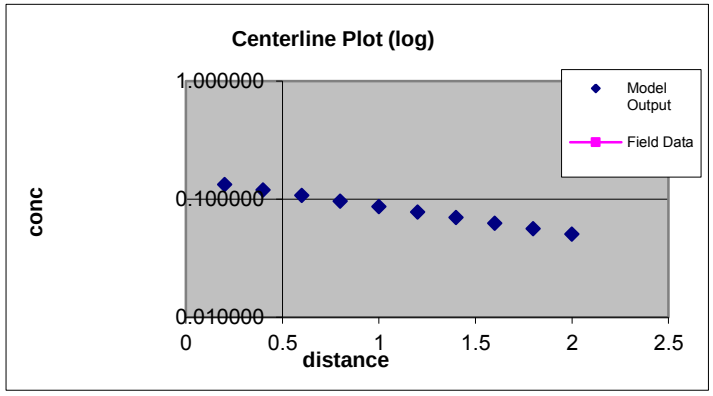
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	2,200.00	5.00E-03	55.13571429	0.001243684

Point Concentration

x(ft)	y(ft)	z(ft)
1.617001	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	1.617000617	0	0
at	1E+99	days =	**0.062000**
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	2
Width (ft)	100

	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.066450	0.059670	0.053582	0.048115	0.043206	0.038798	0.034839	0.031285	0.028093	0.025227
0	0.132900	0.119340	0.107164	0.096231	0.086412	0.077596	0.069679	0.062570	0.056186	0.050453
-50	0.066450	0.059670	0.053582	0.048115	0.043206	0.038798	0.034839	0.031285	0.028093	0.025227
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.1
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

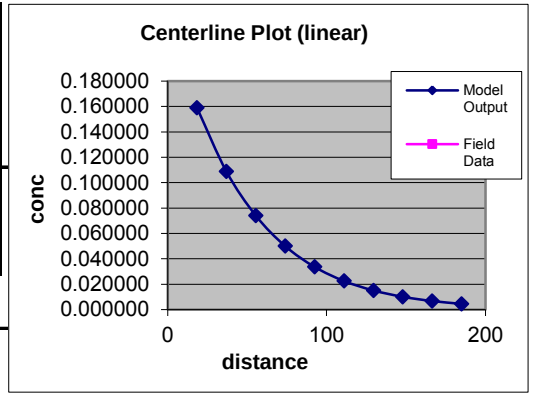
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.232000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

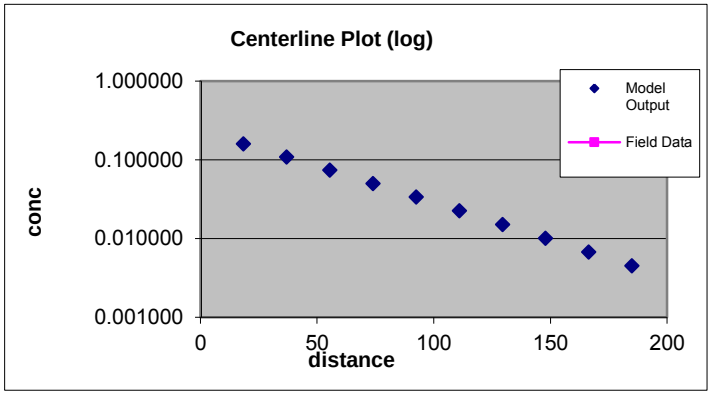
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	58.00	5.00E-03	2.427214286	0.028251081

Point Concentration

x(ft)	y(ft)	z(ft)
180.170675	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	180.1706751	0	0
at	1E+99	days =	0.005000
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	185
Width (ft)	100

	18.5	37	55.5	74	92.5	111	129.5	148	166.5	185
100	0.000000	0.000066	0.000309	0.000567	0.000715	0.000742	0.000689	0.000596	0.000491	0.000391
50	0.079471	0.054445	0.037300	0.025554	0.017506	0.011992	0.008212	0.005622	0.003848	0.002632
0	0.158941	0.108757	0.073983	0.049973	0.033585	0.022503	0.015056	0.010067	0.006731	0.004502
-50	0.079471	0.054445	0.037300	0.025554	0.017506	0.011992	0.008212	0.005622	0.003848	0.002632
-100	0.000000	0.000066	0.000309	0.000567	0.000715	0.000742	0.000689	0.000596	0.000491	0.000391
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.2
Quick Domenico
Fate and Transport Model Input and Output
S-364
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-364	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.001	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.009800
Lambda (per day)		day^{-1}	0.000958904
KOC			58

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzene	0.009800	0.005000	0.005000	32.888301

Figure K.2
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.009800	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

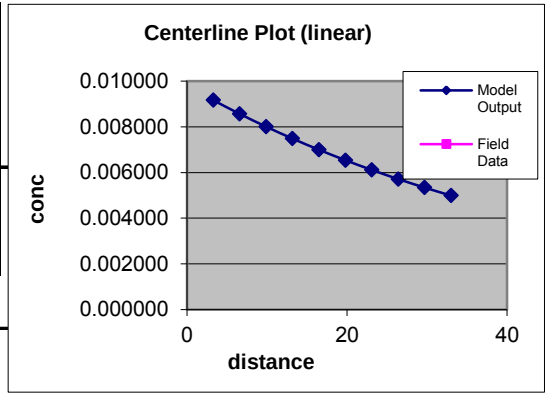
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	58.00	5.00E-03	2.427214286	0.028251081

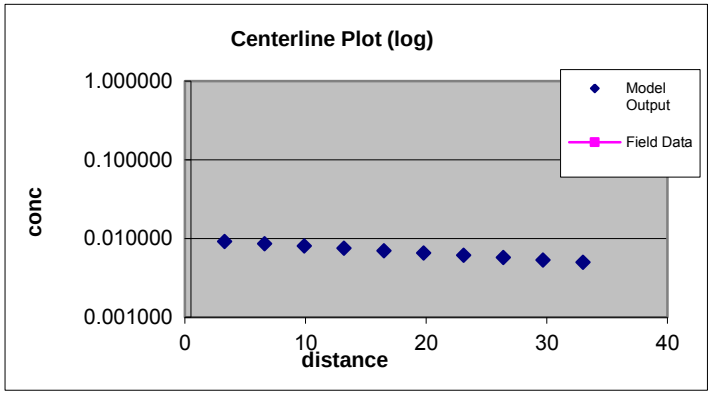
Point Concentration

x(ft)	y(ft)	z(ft)
32.888301	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	32.88830068	0	0
at	1E+99	days =	

0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 33
Width (ft) 100

	3.3	6.6	9.9	13.2	16.5	19.8	23.1	26.4	29.7	33
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000002
50	0.004580	0.004282	0.004002	0.003741	0.003497	0.003269	0.003056	0.002856	0.002670	0.002496
0	0.009161	0.008563	0.008004	0.007482	0.006994	0.006538	0.006111	0.005712	0.005338	0.004989
-50	0.004580	0.004282	0.004002	0.003741	0.003497	0.003269	0.003056	0.002856	0.002670	0.002496
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000002
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.3
Quick Domenico
Fate and Transport Model Input and Output
MW-4
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				**Data Source**
Source Identification (or Well ID)			MW-4	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.005	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	ρ_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.128000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 2			
Contaminant			Benzo(a)pyrene
Source Concentration (mg/l)		mg/l	0.002450
Lambda (per day)		day^{-1}	0.000658
KOC			910000
Sim 3			
Contaminant			Benzo(b)fluoranthene
Source Concentration (mg/l)		mg/l	0.002480
Lambda (per day)		day^{-1}	0.000575
KOC			550000
Sim 4			
Contaminant			Benzo(g,h,i)perylene
Source Concentration (mg/l)		mg/l	0.001830
Lambda (per day)		day^{-1}	0.000521
KOC			2800000
Sim 5			
Contaminant			Chrysene
Source Concentration (mg/l)		mg/l	0.002940
Lambda (per day)		day^{-1}	0.000356164
KOC			490000

Output				
Contaminant	**Starting Concentration (mg/l)**	**Screening Criteria (mg/l)**	**Predicted Concentration (mg/l)**	**Distance to Meet Screening Criteria (ft)**
Sim 1 - Benzene	0.128000	0.005000	0.005000	484.928697
Sim 2 - Benzo(a)pyrene	0.002450	0.000200	0.000200	2.201463
Sim 3 - Benzo(b)fluoranthene	0.002480	0.001200	0.001200	0.882091
Sim 4 - Benzo(g,h,i)perylene	0.001830	0.000260	0.000260	1.093212
Sim 5 - Chrysene	0.002940	0.001900	0.001900	0.718653

Figure K.3
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

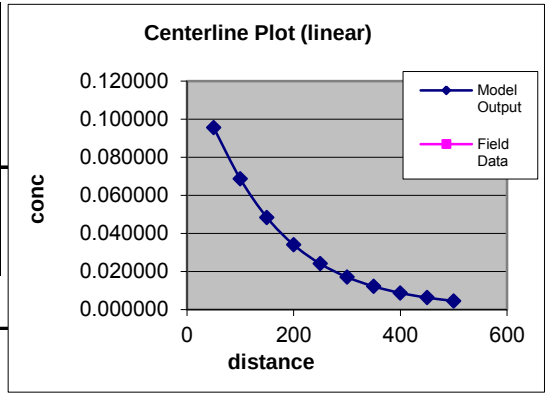
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.128000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

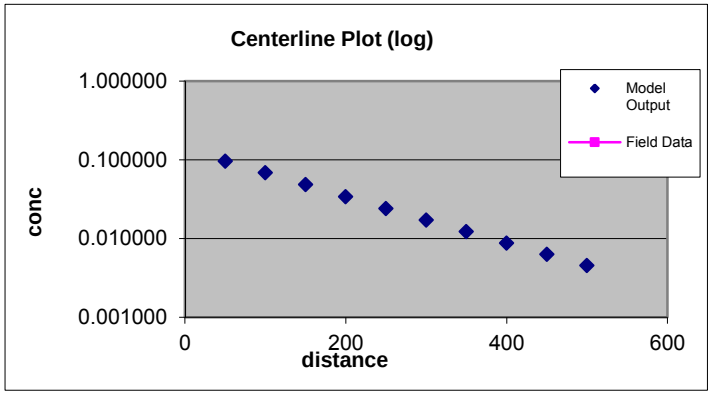
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.005	0.35	1.72	58.00	5.00E-03	2.427214286	0.141255407

Point Concentration

x(ft)	y(ft)	z(ft)
484.928697	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	484.9286969	0	0
at	1E+99	days =	0.005000
			mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 500
Width (ft) 100

	50	100	150	200	250	300	350	400	450	500
100	0.000260	0.001774	0.002933	0.003341	0.003259	0.002931	0.002512	0.002085	0.001693	0.001353
50	0.048060	0.036088	0.027066	0.020242	0.015087	0.011212	0.008313	0.006154	0.004551	0.003363
0	0.095602	0.068633	0.048338	0.034020	0.024043	0.017076	0.012186	0.008733	0.006282	0.004533
-50	0.048060	0.036088	0.027066	0.020242	0.015087	0.011212	0.008313	0.006154	0.004551	0.003363
-100	0.000260	0.001774	0.002933	0.003341	0.003259	0.002931	0.002512	0.002085	0.001693	0.001353
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.3
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(a)pyrene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.002450	3.23E+01	3.23E+00	1.00E-04	6.580E-04	100	36	1E+99

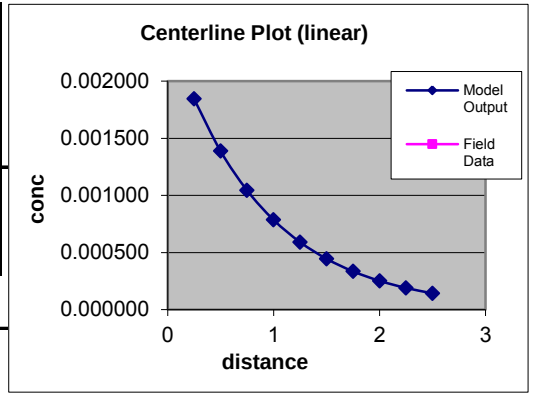
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.005	0.35	1.72	910,000.00	5.00E-03	22393.5	1.53106E-05

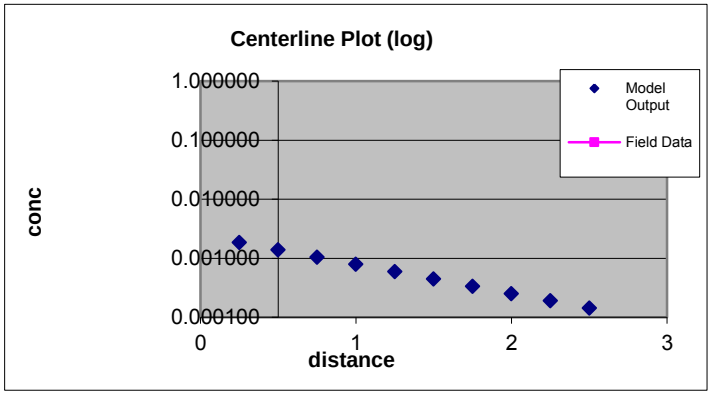
Point Concentration

x(ft)	y(ft)	z(ft)
2.201463	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	2.201462988	0	0
at	1E+99	days =	

0.000200 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 2.5
Width (ft) 100

	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000922	0.000693	0.000522	0.000393	0.000295	0.000222	0.000167	0.000126	0.000095	0.000071
0	0.001843	0.001387	0.001043	0.000785	0.000591	0.000444	0.000334	0.000252	0.000189	0.000142
-50	0.000922	0.000693	0.000522	0.000393	0.000295	0.000222	0.000167	0.000126	0.000095	0.000071
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	Centerline C Concentration									
	Distance from Source									

Figure K.3
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(b)fluoranthene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.002480	3.23E+01	3.23E+00	1.00E-04	5.750E-04	100	36	1E+99

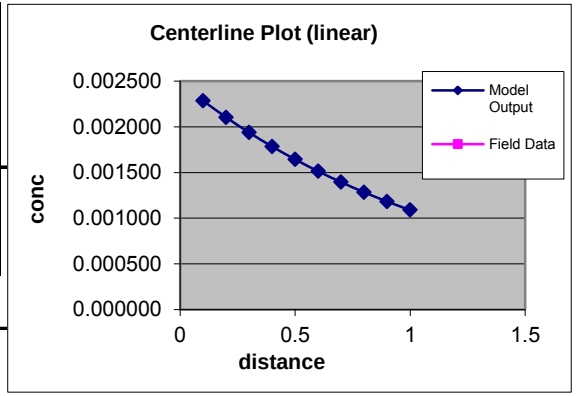
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.005	0.35	1.72	550,000.00	5.00E-03	13534.92857	2.53313E-05

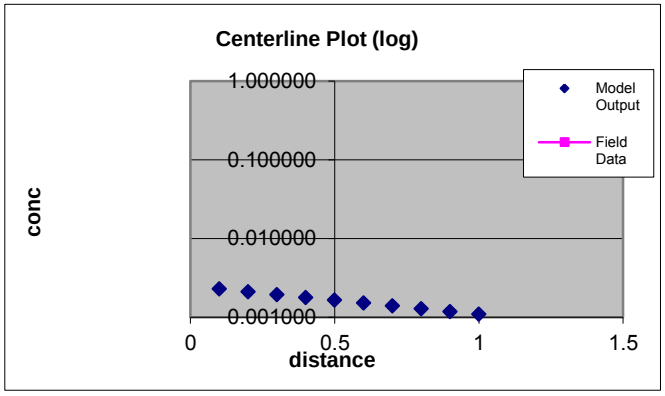
Point Concentration

x(ft)	y(ft)	z(ft)
0.882091	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	0.882091489	0	0
at	1E+99	days =	

0.001200 mg/l





AREAL MODEL DOMAIN	CALCULATION
Length (ft)	1
Width (ft)	100

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.001142	0.001052	0.000969	0.000892	0.000822	0.000757	0.000697	0.000642	0.000591	0.000545
0	0.002284	0.002104	0.001937	0.001784	0.001643	0.001514	0.001394	0.001284	0.001182	0.001089
-50	0.001142	0.001052	0.000969	0.000892	0.000822	0.000757	0.000697	0.000642	0.000591	0.000545
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C	Concentration							
	Distance from Source								

Figure K.3
SIM 4

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(g,h,i)perylene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

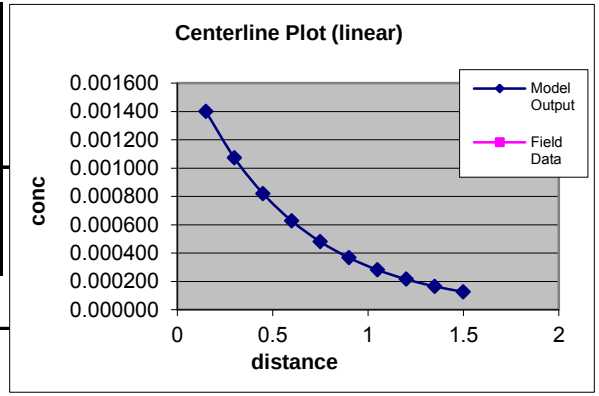
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.001830	3.23E+01	3.23E+00	1.00E-04	5.210E-04	100	36	1E+99

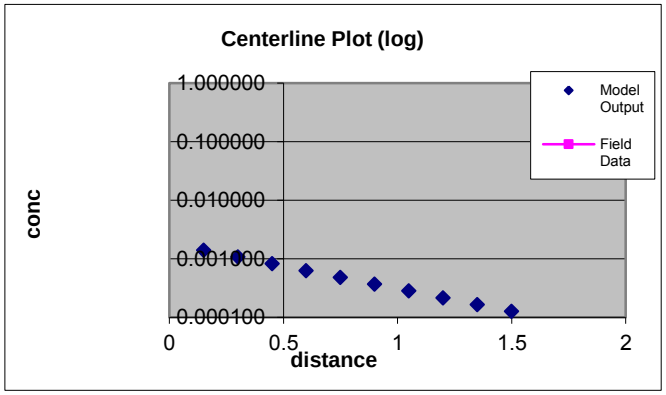
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{-3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.005	0.35	1.72	##########	5.00E-03	68901	4.97608E-06

Point Concentration

x(ft)	y(ft)	z(ft)
1.093212	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	1.093211698	0	0
at	1E+99	days =	0.000260 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 1.5
Width (ft) 100

	0.15	0.3	0.45	0.6	0.75	0.9	1.05	1.2	1.35	1.5
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000700	0.000536	0.000410	0.000314	0.000240	0.000184	0.000140	0.000107	0.000082	0.000063
0	0.001400	0.001071	0.000820	0.000627	0.000480	0.000367	0.000281	0.000215	0.000164	0.000126
-50	0.000700	0.000536	0.000410	0.000314	0.000240	0.000184	0.000140	0.000107	0.000082	0.000063
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.3
SIM 5

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Chrysene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

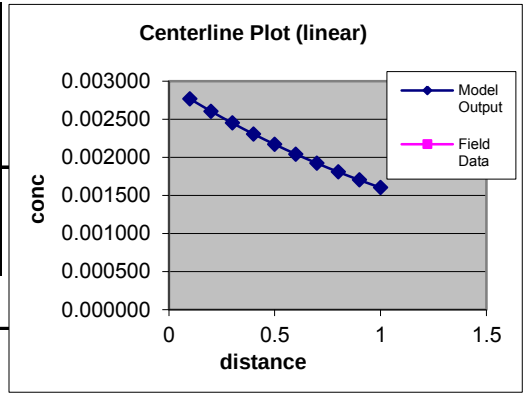
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.002940	3.23E+01	3.23E+00	1.00E-04	3.562E-04	100	36	1E+99

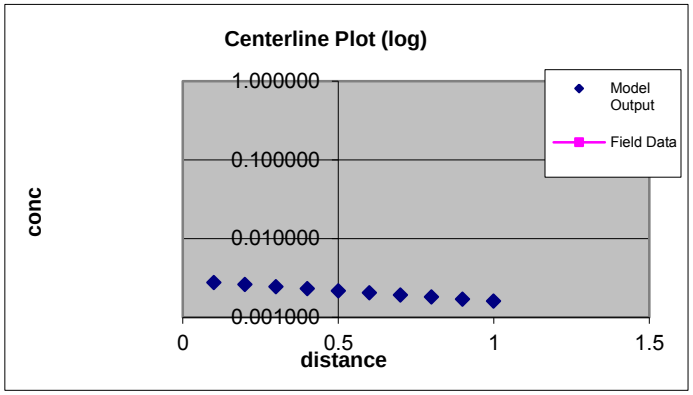
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.005	0.35	1.72	490,000.00	5.00E-03	12058.5	2.84328E-05

Point Concentration

x(ft)	y(ft)	z(ft)
0.718653	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	0.718653429	0	0
at	1E+99	days =	0.001900
			mg/l





AREAL MODEL DOMAIN
Length (ft) 1
Width (ft) 100

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.001383	0.001302	0.001225	0.001153	0.001085	0.001021	0.000961	0.000904	0.000851	0.000801
0	0.002767	0.002604	0.002450	0.002306	0.002170	0.002042	0.001922	0.001808	0.001702	0.001602
-50	0.001383	0.001302	0.001225	0.001153	0.001085	0.001021	0.000961	0.000904	0.000851	0.000801
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data: Centerline C Concentration
Distance from Source

Figure K.4
Quick Domenico
Fate and Transport Model Input and Output
S-36
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				**Data Source**
Source Identification (or Well ID)			S-36	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.003	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			1,3,5-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.055500
Lambda (per day)		day^{-1}	0.012328767
KOC			660
Sim 2			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.288000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 3			
Contaminant			MTBE
Source Concentration (mg/l)		mg/l	0.021900
Lambda (per day)		day^{-1}	0.001890411

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - 1,3,5-Trimethylbenzene	0.055500	0.053000	0.053000	0.280962
Sim 2 - Benzene	0.288000	0.005000	0.005000	414.109080
Sim 3 - MTBE	0.021900	0.020000	0.020000	9.885424

Figure K.4
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,3,5-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

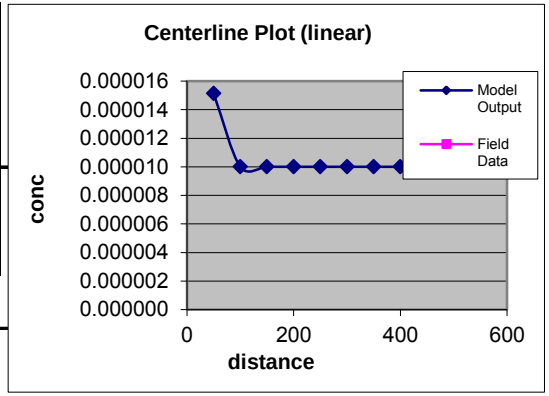
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.055500	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

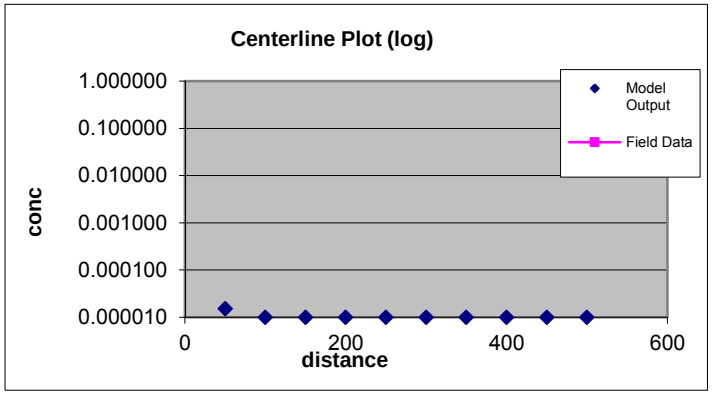
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.003	0.35	1.72	660.00	5.00E-03	17.24071429	0.011931889

Point Concentration

x(ft)	y(ft)	z(ft)
0.280962	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	0.280962167	0	0
at	1E+99	days =	0.053000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 500
Width (ft) 100

	50	100	150	200	250	300	350	400	450	500
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000008	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0	0.000015	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010
-50	0.000008	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration								
	Distance from Source								

Figure K.4
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.288000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

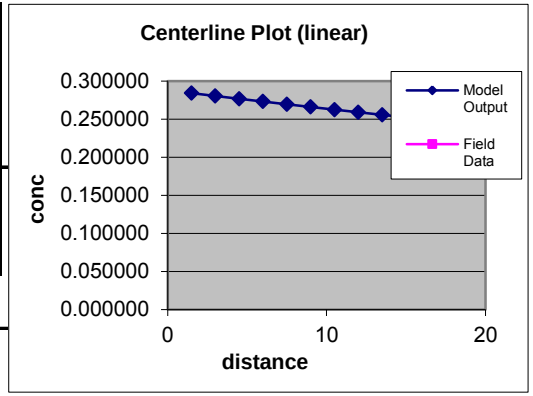
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.003	0.35	1.72	58.00	5.00E-03	2.427214286	0.084753244

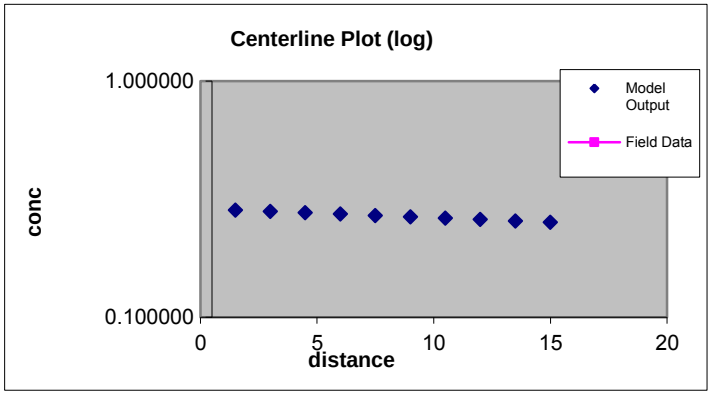
Point Concentration

x(ft)	y(ft)	z(ft)
414.109080	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	414.1090797	0	0
at	1E+99	days =	

0.005000 mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	15
Width (ft)	100

	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.142110	0.140245	0.138404	0.136587	0.134795	0.133025	0.131279	0.129556	0.127856	0.126178
0	0.284220	0.280489	0.276808	0.273175	0.269589	0.266051	0.262559	0.259113	0.255712	0.252355
-50	0.142110	0.140245	0.138404	0.136587	0.134795	0.133025	0.131279	0.129556	0.127856	0.126178
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.4
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: MTBE

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.021900	3.23E+01	3.23E+00	1.00E-04	1.890E-03	100	36	1E+99

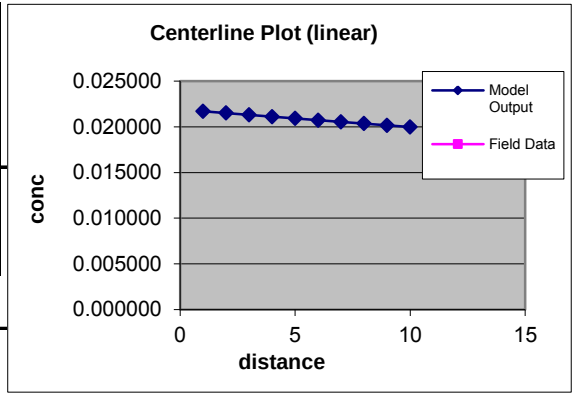
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.003	0.35	1.72	12.00	5.00E-03	1.295285714	0.158817691

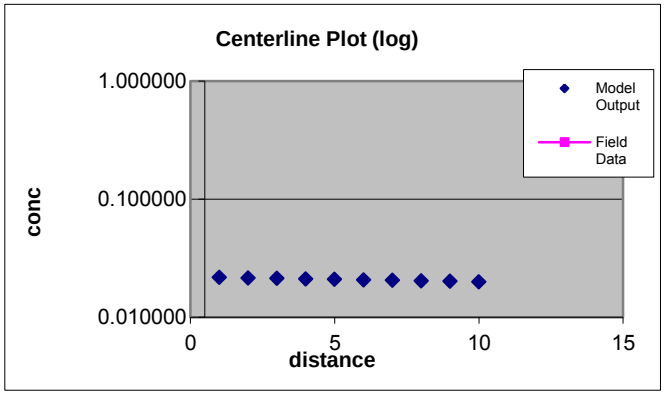
Point Concentration

x(ft)	y(ft)	z(ft)
9.885424	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	9.885423905	0	0
at	1E+99	days =	

0.020000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 10
Width (ft) 100

	1	2	3	4	5	6	7	8	9	10
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.010850	0.010751	0.010653	0.010555	0.010459	0.010363	0.010268	0.010175	0.010082	0.009989
0	0.021700	0.021502	0.021305	0.021110	0.020917	0.020726	0.020537	0.020349	0.020163	0.019979
-50	0.010850	0.010751	0.010653	0.010555	0.010459	0.010363	0.010268	0.010175	0.010082	0.009989
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C	Concentration							
	Distance from Source								

Figure K.5
Quick Domenico
Fate and Transport Model Input and Output
S-379
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-379	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.001	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.019900
Lambda (per day)		day^{-1}	0.000958904
KOC			58

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzene	0.019900	0.005000	0.005000	66.774514

Figure K.5
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

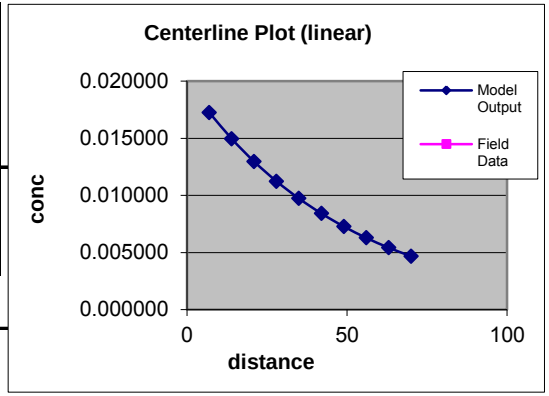
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.019900	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

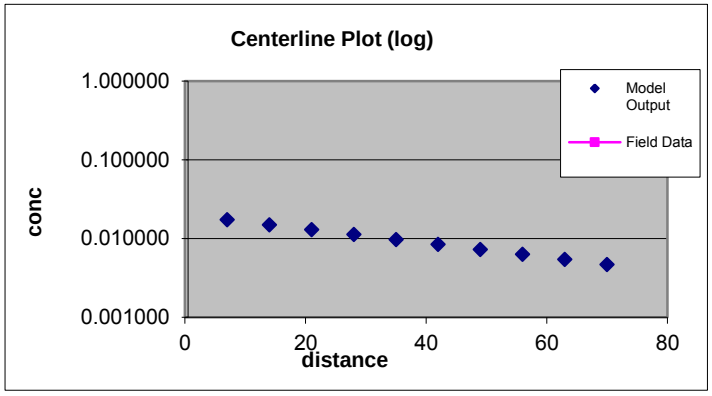
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	58.00	5.00E-03	2.427214286	0.028251081

Point Concentration

x(ft)	y(ft)	z(ft)
66.774514	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	66.77451433	0	0
at	1E+99	days =	0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 70
Width (ft) 100

	7	14	21	28	35	42	49	56	63	70
100	0.000000	0.000000	0.000000	0.000001	0.000004	0.000010	0.000018	0.000027	0.000036	0.000045
50	0.008623	0.007474	0.006477	0.005613	0.004865	0.004216	0.003654	0.003167	0.002745	0.002379
0	0.017247	0.014947	0.012954	0.011225	0.009721	0.008412	0.007272	0.006280	0.005417	0.004668
-50	0.008623	0.007474	0.006477	0.005613	0.004865	0.004216	0.003654	0.003167	0.002745	0.002379
-100	0.000000	0.000000	0.000000	0.000001	0.000004	0.000010	0.000018	0.000027	0.000036	0.000045
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.6
Quick Domenico
Fate and Transport Model Input and Output
S-28
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-28	
Sample Date			May 2005 and June2013	Average concentration of 2005 and 2013 sampling events
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.011	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.028300
Lambda (per day)		day^{-1}	0.000958904
KOC			58

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzene	0.028300	0.005000	0.005000	456.717705

Figure K.6
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

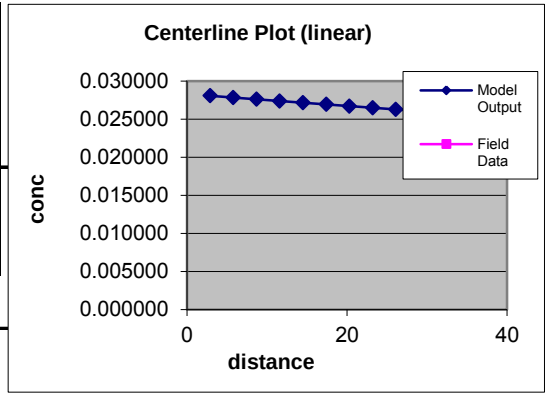
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.028300	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

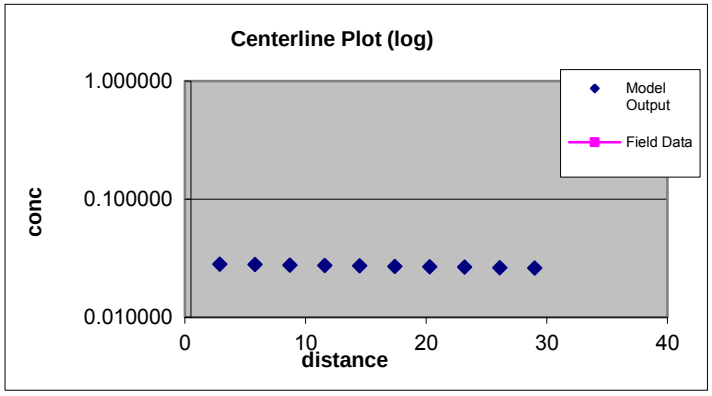
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.011	0.35	1.72	58.00	5.00E-03	2.427214286	0.310761896

Point Concentration

x(ft)	y(ft)	z(ft)
456.717705	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	456.7177046	0	0
at	1E+99	days =	0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 29
Width (ft) 100

	2.9	5.8	8.7	11.6	14.5	17.4	20.3	23.2	26.1	29
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000002	0.000003
50	0.014034	0.013920	0.013806	0.013693	0.013582	0.013471	0.013361	0.013252	0.013143	0.013036
0	0.028069	0.027840	0.027612	0.027387	0.027163	0.026941	0.026721	0.026502	0.026284	0.026065
-50	0.014034	0.013920	0.013806	0.013693	0.013582	0.013471	0.013361	0.013252	0.013143	0.013036
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000002	0.000003
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.7
Quick Domenico
Fate and Transport Model Input and Output
S-381
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-381	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.001	June 2013 Groundwater Gauging
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	ρ_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			1,2,4-Trimethylbenzene
Source Concentration (mg/l)		mg/l	1.130000
Lambda (per day)		day^{-1}	0.012328767
KOC			2200
Sim 2			
Contaminant			1,3,5-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.374000
Lambda (per day)		day^{-1}	0.012328767
KOC			660
Sim 3			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.296000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 4			
Contaminant			MTBE
Source Concentration (mg/l)		mg/l	0.026000
Lambda (per day)		day^{-1}	0.001890411
KOC			12
Sim 5			
Contaminant			Toluene
Source Concentration (mg/l)		mg/l	1.770000
Lambda (per day)		day^{-1}	0.024684932
KOC			130
Sim 6			
Contaminant			Naphthalene
Source Concentration (mg/l)		mg/l	0.136000
Lambda (per day)		day^{-1}	0.002684932
KOC			950

Output				
Contaminant	**Starting Concentration (mg/l)**	**Screening Criteria (mg/l)**	**Predicted Concentration (mg/l)**	**Distance to Meet Screening Criteria (ft)**
Sim 1 - 1,2,4-Trimethylbenzene	1.130000	0.062000	0.062000	5.388320
Sim 2 - 1,3,5-Trimethylbenzene	0.374000	0.053000	0.053000	6.630486
Sim 3 - Benzene	0.296000	0.005000	0.005000	191.382822
Sim 4 - MTBE	0.026000	0.020000	0.020000	12.377638
Sim 5 - Toluene	1.770000	1.000000	0.999999	2.835040
Sim 6 - Naphthalene	0.136000	0.100000	0.100000	1.957032068

Figure K.7
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,2,4-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

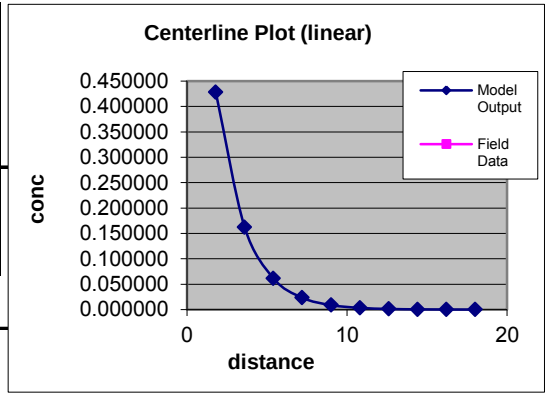
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.130000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

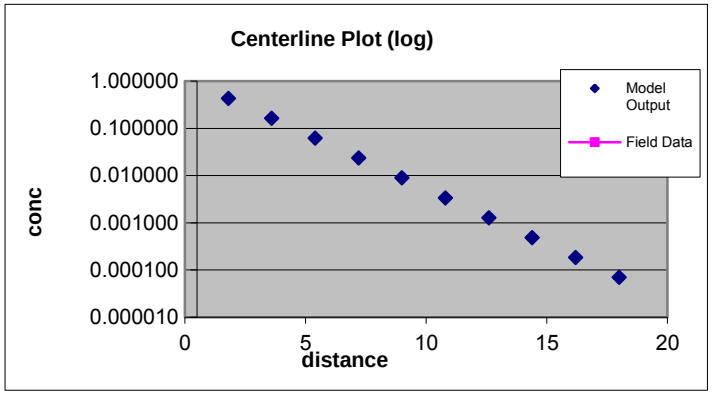
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	2,200.00	5.00E-03	55.13571429	0.001243684

Point Concentration

x(ft)	y(ft)	z(ft)
5.388320	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	5.388319691	0	0
at	1E+99	days =	0.062000 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 18
Width (ft) 100

	1.8	3.6	5.4	7.2	9	10.8	12.6	14.4	16.2	18
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.214244	0.081240	0.030805	0.011681	0.004429	0.001680	0.000637	0.000242	0.000092	0.000035
0	0.428488	0.162479	0.061611	0.023362	0.008859	0.003359	0.001274	0.000483	0.000183	0.000069
-50	0.214244	0.081240	0.030805	0.011681	0.004429	0.001680	0.000637	0.000242	0.000092	0.000035
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data: **Centerline C Concentration**
Distance from Source

Figure K.7
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,3,5-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.374000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

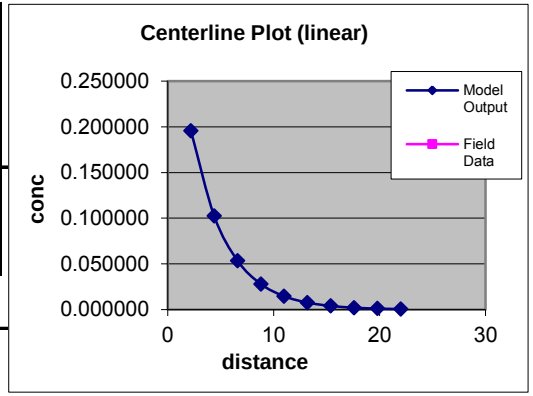
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	660.00	5.00E-03	17.24071429	0.003977296

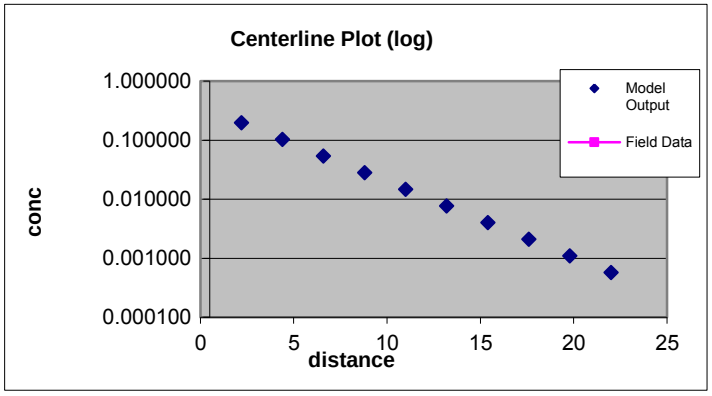
Point Concentration

x(ft)	y(ft)	z(ft)
6.630486	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	6.630485784	0	0
at	1E+99	days =	

0.053000 mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	22
Width (ft)	100

	2.2	4.4	6.6	8.8	11	13.2	15.4	17.6	19.8	22
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.097786	0.051134	0.026739	0.013982	0.007312	0.003823	0.001999	0.001045	0.000547	0.000286
0	0.195572	0.102268	0.053478	0.027965	0.014623	0.007647	0.003999	0.002091	0.001093	0.000572
-50	0.097786	0.051134	0.026739	0.013982	0.007312	0.003823	0.001999	0.001045	0.000547	0.000286
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.7
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.296000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

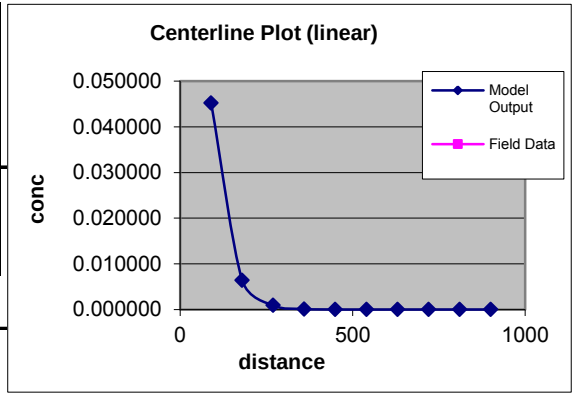
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	58.00	5.00E-03	2.427214286	0.028251081

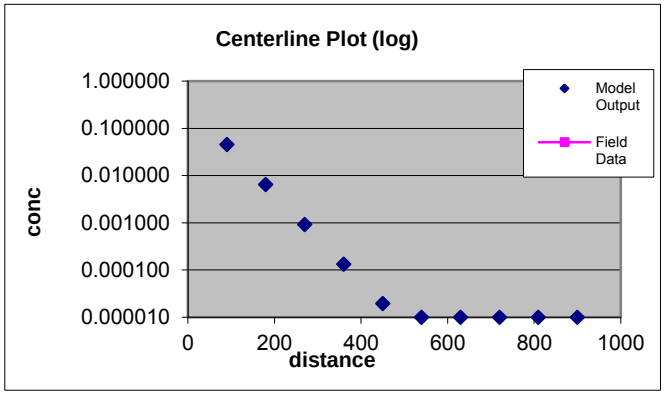
Point Concentration

x(ft)	y(ft)	z(ft)
191.382822	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	191.3828222	0	0
at	1E+99	days =	

0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 900
Width (ft) 100

	90	180	270	360	450	540	630	720	810	900
100	0.000896	0.000532	0.000137	0.000028	0.000005	0.000001	0.000000	0.000000	0.000000	0.000000
50	0.023507	0.003721	0.000583	0.000091	0.000014	0.000002	0.000000	0.000000	0.000000	0.000000
0	0.045223	0.006403	0.000912	0.000132	0.000019	0.000010	0.000010	0.000010	0.000010	0.000010
-50	0.023507	0.003721	0.000583	0.000091	0.000014	0.000002	0.000000	0.000000	0.000000	0.000000
-100	0.000896	0.000532	0.000137	0.000028	0.000005	0.000001	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C	Concentration							
	Distance from Source								

Figure K.7
SIM 4

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: MTBE

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

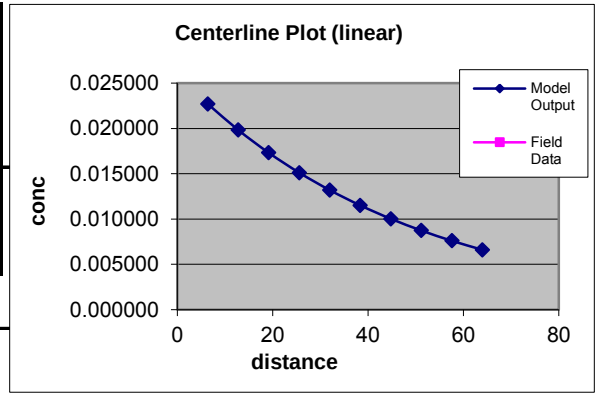
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.026000	3.23E+01	3.23E+00	1.00E-04	1.890E-03	100	36	1E+99

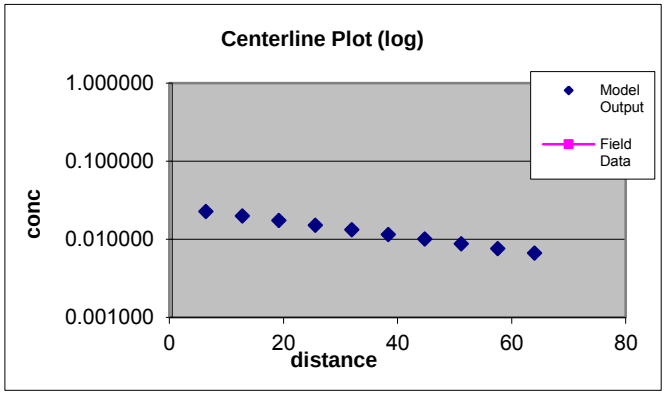
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	12.00	5.00E-03	1.295285714	0.05293923

Point Concentration

x(ft)	y(ft)	z(ft)
12.377638	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	12.37763751	0	0
at	1E+99	days =	0.020000 mg/l





AREAL MODEL **CALCULATION DOMAIN**

Length (ft) 64
Width (ft) 100

	6.4	12.8	19.2	25.6	32	38.4	44.8	51.2	57.6	64
100	0.000000	0.000000	0.000000	0.000001	0.000003	0.000009	0.000017	0.000026	0.000037	0.000047
50	0.011351	0.009911	0.008654	0.007556	0.006597	0.005760	0.005030	0.004392	0.003834	0.003348
0	0.022702	0.019822	0.017307	0.015110	0.013188	0.011503	0.010026	0.008731	0.007596	0.006603
-50	0.011351	0.009911	0.008654	0.007556	0.006597	0.005760	0.005030	0.004392	0.003834	0.003348
-100	0.000000	0.000000	0.000000	0.000001	0.000003	0.000009	0.000017	0.000026	0.000037	0.000047

Field Data: **Centerline C Concentration**
Distance from Source

Figure K.7
SIM 5

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Toluene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

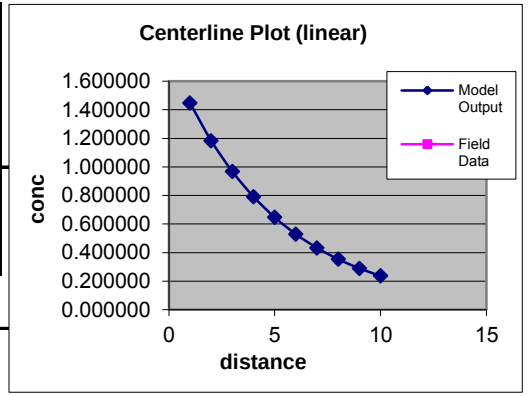
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.770000	3.23E+01	3.23E+00	1.00E-04	2.468E-02	100	36	1E+99

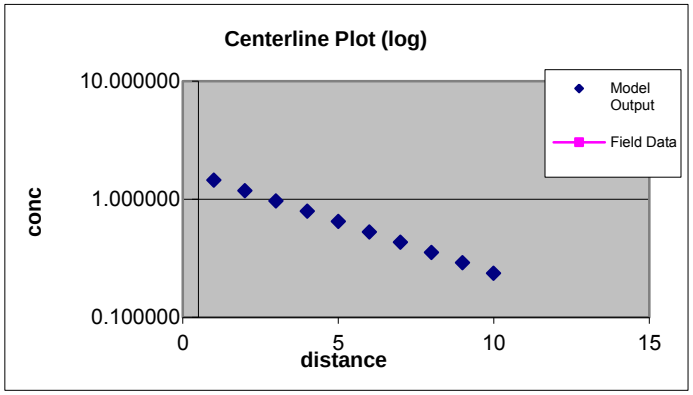
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	130.00	5.00E-03	4.198928571	0.016330697

Point Concentration

x(ft)	y(ft)	z(ft)
2.835040	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	2.835040064	0	0
at	1E+99	days =	0.999999
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	10
Width (ft)	100

	1	2	3	4	5	6	7	8	9	10
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.723562	0.591573	0.483661	0.395434	0.323301	0.264325	0.216108	0.176687	0.144456	0.118105
0	1.447124	1.183146	0.967322	0.790868	0.646601	0.528651	0.432217	0.353374	0.288913	0.236211
-50	0.723562	0.591573	0.483661	0.395434	0.323301	0.264325	0.216108	0.176687	0.144456	0.118105
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.7
SIM 6

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Naphthalene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

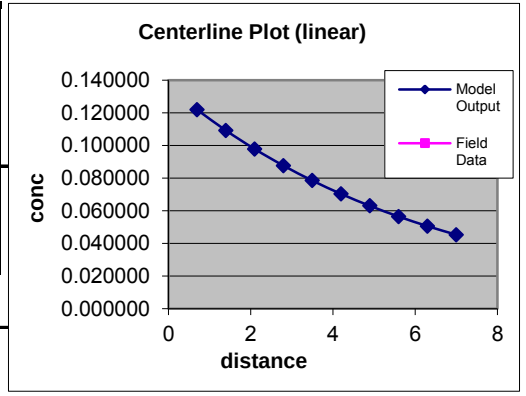
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.136000	3.23E+01	3.23E+00	1.00E-04	2.685E-03	100	36	1E+99

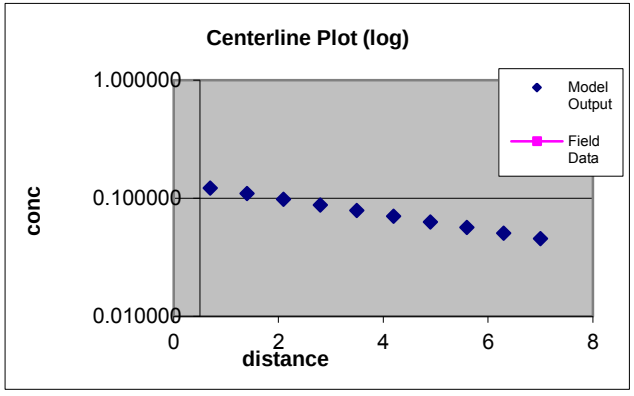
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.001	0.35	1.72	950.00	5.00E-03	24.37678571	0.002812981

Point Concentration

x(ft)	y(ft)	z(ft)
1.957032	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	1.957032068	0	0
at	1E+99	days =	0.100000
			mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 7
Width (ft) 100

	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.060918	0.054573	0.048889	0.043798	0.039236	0.035150	0.031489	0.028209	0.025271	0.022639
0	0.121836	0.109146	0.097779	0.087595	0.078472	0.070299	0.062977	0.056418	0.050542	0.045278
-50	0.060918	0.054573	0.048889	0.043798	0.039236	0.035150	0.031489	0.028209	0.025271	0.022639
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data: Centerline C Concentration
Distance from Source

Figure K.8
Quick Domenico
Fate and Transport Model Input and Output
S-223
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-223	
Sample Date			August 2005 and June 2013	see below for source concentrations
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	ρ_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters				
Sim 1				
Contaminant			1,2,4-Trimethylbenzene	June 2013 sampling event
Source Concentration (mg/l)		mg/l	0.766000	
Lambda (per day)		day^{-1}	0.012328767	
KOC			2200	
Sim 2				
Contaminant			1,3,5-Trimethylbenzene	June 2013 sampling event
Source Concentration (mg/l)		mg/l	0.269000	
Lambda (per day)		day^{-1}	0.012328767	
KOC			660	
Sim 3				
Contaminant			Benzene	June 2013 sampling event
Source Concentration (mg/l)		mg/l	7.400000	
Lambda (per day)		day^{-1}	0.000958904	
KOC			58	
Sim 4				
Contaminant			Ethylbenzene	Average of August 2005 an June 2013 sampling events
Source Concentration (mg/l)		mg/l	1.005000	
Lambda (per day)		day^{-1}	0.003041096	
KOC			220	
Sim 5				
Contaminant			Toluene	Average of August 2005 an June 2013 sampling events
Source Concentration (mg/l)		mg/l	6.225000	
Lambda (per day)		day^{-1}	0.024684932	
KOC			130	
Sim 6				
Contaminant			Naphthalene	Average of August 2005 an June 2013 sampling events
Source Concentration (mg/l)		mg/l	0.295000	
Lambda (per day)		day^{-1}	0.002684932	
KOC			950	

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - 1,2,4-Trimethylbenzene	0.766000	0.062000	0.062000	8.945364
Sim 2 - 1,3,5-Trimethylbenzene	0.269000	0.053000	0.053000	10.769837
Sim 3 - Benzene	7.400000	0.005000	0.004997	851.901690
Sim 4 - Ethylbenzene	1.005000	0.700000	0.699999	9.770856
Sim 5 - Toluene	6.225000	1.000000	0.999998	18.071793
Sim 6 - Naphthalene	0.295000	0.100000	0.100000	13.92275782

Figure K.8
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,2,4-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.766000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

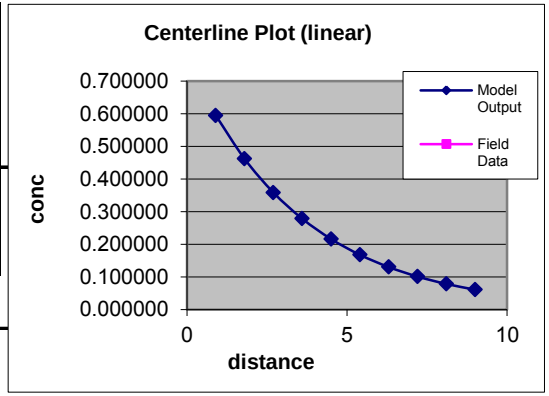
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	2,200.00	5.00E-03	55.13571429	0.004352895

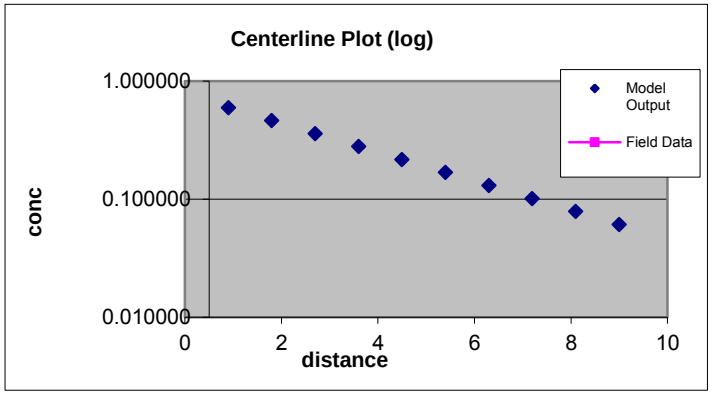
Point Concentration

x(ft)	y(ft)	z(ft)
8.945364	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	8.945363636	0	0
at	1E+99	days =	

0.062000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 9
Width (ft) 100

	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.297405	0.230939	0.179327	0.139250	0.108130	0.083964	0.065199	0.050628	0.039313	0.030527
0	0.594809	0.461878	0.358654	0.278500	0.216259	0.167928	0.130398	0.101256	0.078627	0.061055
-50	0.297405	0.230939	0.179327	0.139250	0.108130	0.083964	0.065199	0.050628	0.039313	0.030527
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.8
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,3,5-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

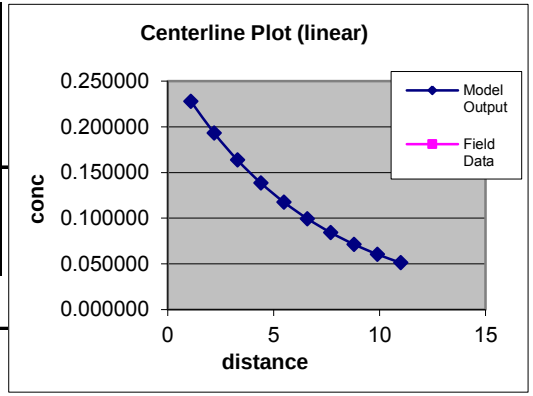
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.269000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

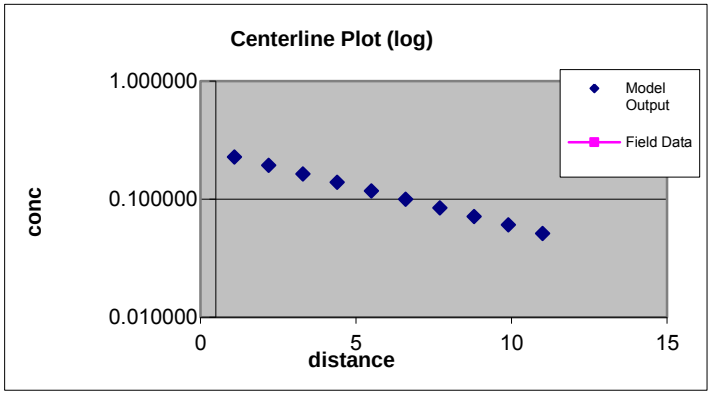
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	660.00	5.00E-03	17.24071429	0.013920537

Point Concentration

x(ft)	y(ft)	z(ft)
10.769837	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	10.76983679	0	0
at	1E+99	days =	0.053000 mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	11
Width (ft)	100

	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.113938	0.096519	0.081763	0.069263	0.058674	0.049704	0.042105	0.035668	0.030215	0.025596
0	0.227875	0.193037	0.163526	0.138526	0.117348	0.099408	0.084210	0.071336	0.060430	0.051191
-50	0.113938	0.096519	0.081763	0.069263	0.058674	0.049704	0.042105	0.035668	0.030215	0.025596
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.8
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
7.400000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

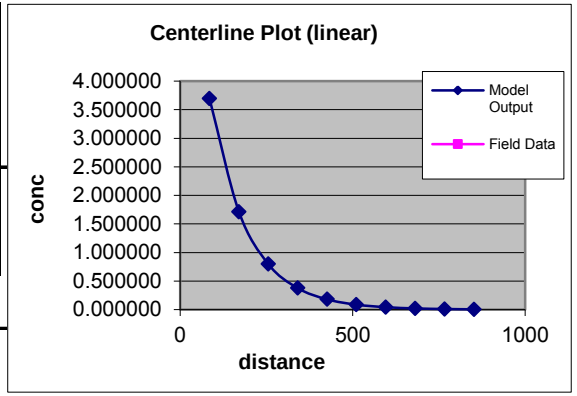
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	58.00	5.00E-03	2.427214286	0.098878785

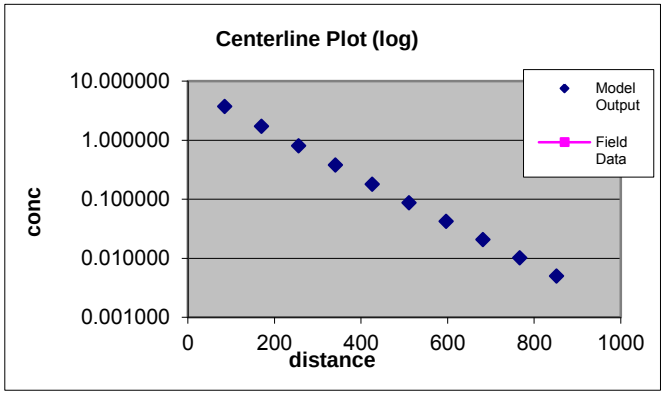
Point Concentration

x(ft)	y(ft)	z(ft)
851.901690	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	851.9016903	0	0
at	1E+99	days =	

0.004997 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 852
Width (ft) 100

	85.2	170.4	255.6	340.8	426	511.2	596.4	681.6	766.8	852
100	0.063192	0.130078	0.111270	0.075082	0.045722	0.026348	0.014682	0.008005	0.004299	0.002284
50	1.910896	0.984394	0.502660	0.254550	0.128266	0.064475	0.032380	0.016262	0.008171	0.004108
0	3.695485	1.713709	0.796678	0.375617	0.179328	0.086476	0.042033	0.020561	0.010110	0.004993
-50	1.910896	0.984394	0.502660	0.254550	0.128266	0.064475	0.032380	0.016262	0.008171	0.004108
-100	0.063192	0.130078	0.111270	0.075082	0.045722	0.026348	0.014682	0.008005	0.004299	0.002284

Field Data:	Centerline C	Concentration							
	Distance from Source								

Figure K.8
SIM 4

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Ethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

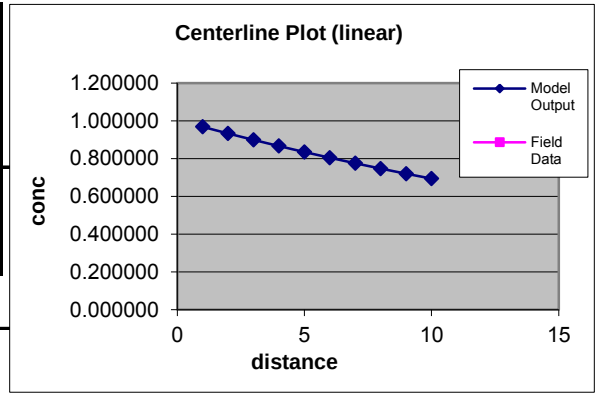
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.005000	3.23E+01	3.23E+00	1.00E-04	3.041E-03	100	36	1E+99

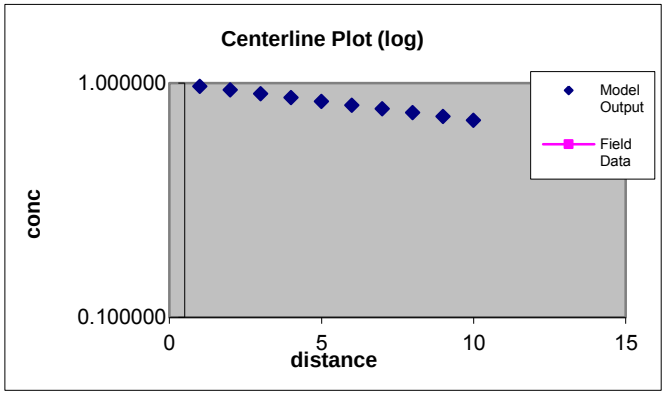
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	220.00	5.00E-03	6.413571429	0.037420648

Point Concentration

x(ft)	y(ft)	z(ft)
9.770856	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	9.770855966	0	0
at	1E+99	days =	0.699999
			mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 10
Width (ft) 100

	1	2	3	4	5	6	7	8	9	10
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.484240	0.466644	0.449687	0.433347	0.417600	0.402425	0.387802	0.373710	0.360130	0.347044
0	0.968480	0.933288	0.899374	0.866693	0.835199	0.804850	0.775603	0.747420	0.720260	0.694087
-50	0.484240	0.466644	0.449687	0.433347	0.417600	0.402425	0.387802	0.373710	0.360130	0.347044
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.8
SIM 5

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Toluene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

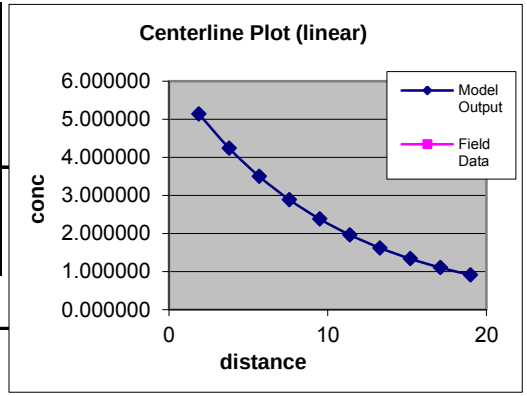
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
6.225000	3.23E+01	3.23E+00	1.00E-04	2.468E-02	100	36	1E+99

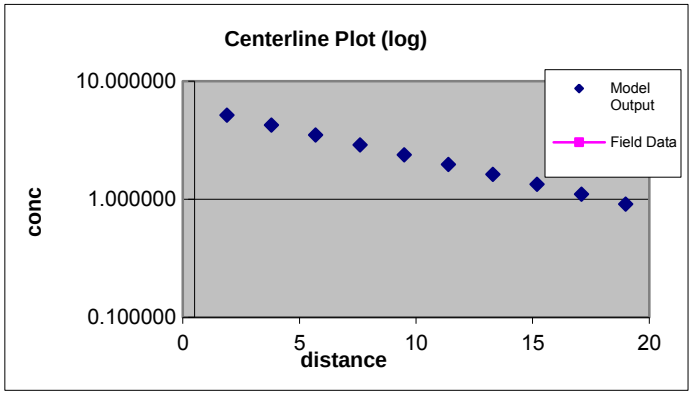
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	130.00	5.00E-03	4.198928571	0.057157438

Point Concentration

x(ft)	y(ft)	z(ft)
18.071793	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	18.07179341	0	0
at	1E+99	days =	0.999998
			mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 19
Width (ft) 100

	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000003
50	2.568128	2.118965	1.748361	1.442575	1.190270	0.982094	0.810327	0.668602	0.551664	0.455179
0	5.136255	4.237931	3.496722	2.885150	2.380541	1.964187	1.620653	1.337203	1.103326	0.910352
-50	2.568128	2.118965	1.748361	1.442575	1.190270	0.982094	0.810327	0.668602	0.551664	0.455179
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000003
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.8
SIM 6

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Naphthalene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.295000	3.23E+01	3.23E+00	1.00E-04	2.685E-03	100	36	1E+99

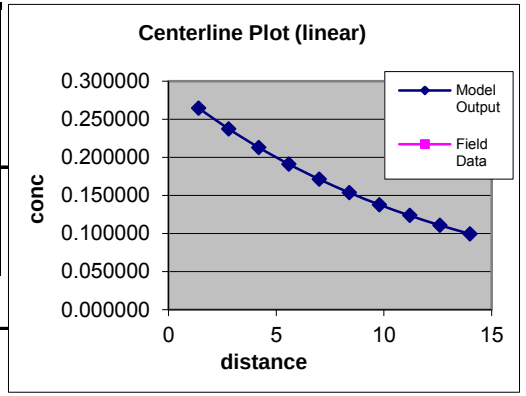
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	950.00	5.00E-03	24.37678571	0.009845433

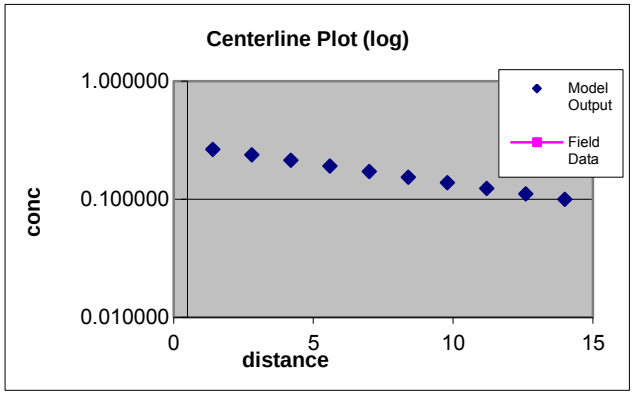
Point Concentration

x(ft)	y(ft)	z(ft)
13.922758	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	13.92275782	0	0
at	1E+99	days =	

0.100000 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 14
Width (ft) 100

	1.4	2.8	4.2	5.6	7	8.4	9.8	11.2	12.6	14
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.132297	0.118660	0.106430	0.095460	0.085620	0.076795	0.068880	0.061780	0.055412	0.049701
0	0.264593	0.237321	0.212860	0.190919	0.171241	0.153590	0.137759	0.123560	0.110824	0.099401
-50	0.132297	0.118660	0.106430	0.095460	0.085620	0.076795	0.068880	0.061780	0.055412	0.049701
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data: Centerline C Concentration
Distance from Source

Figure K.9
Quick Domenico
Fate and Transport Model Input and Output
RW-707
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			RW-707	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			1,2,4-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.590000
Lambda (per day)		day^{-1}	0.012328767
KOC			2200
Sim 2			
Contaminant			1,3,5-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.221000
Lambda (per day)		day^{-1}	0.012328767
KOC			660
Sim 3			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.605000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 4			
Contaminant			MTBE
Source Concentration (mg/l)		mg/l	0.026600
Lambda (per day)		day^{-1}	0.001890411
KOC			12

Output				
Contaminant	**Starting Concentration (mg/l)**	**Screening Criteria (mg/l)**	**Predicted Concentration (mg/l)**	**Distance to Meet Screening Criteria (ft)**
Sim 1 - 1,2,4-Trimethylbenzene	0.590000	0.062000	0.062000	8.016453
Sim 2 - 1,3,5-Trimethylbenzene	0.221000	0.053000	0.053000	9.466711
Sim 3 - Benzene	0.605000	0.005000	0.005000	552.008342
Sim 4 - MTBE	0.026600	0.020000	0.020000	35.142801

Figure K.9
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,2,4-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.590000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

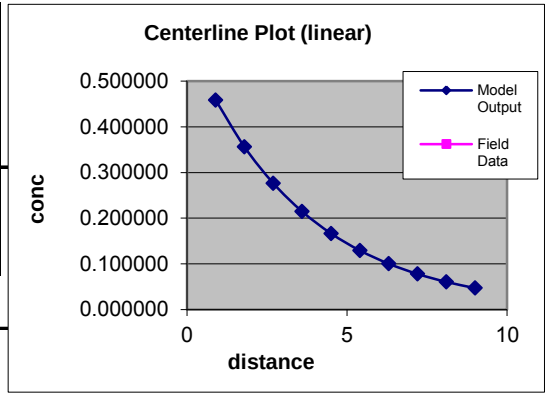
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	2,200.00	5.00E-03	55.13571429	0.004352895

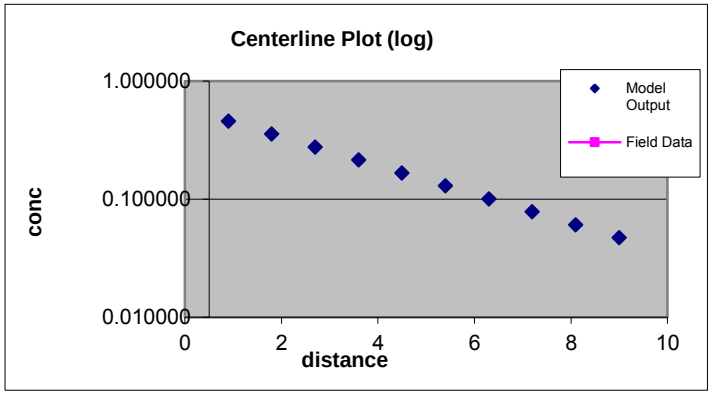
Point Concentration

x(ft)	y(ft)	z(ft)
8.016453	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	8.016452749	0	0
at	1E+99	days =	

0.062000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 9
Width (ft) 100

	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.229072	0.177877	0.138124	0.107255	0.083285	0.064672	0.050219	0.038996	0.030281	0.023513
0	0.458143	0.355754	0.276248	0.214510	0.166570	0.129344	0.100437	0.077991	0.060561	0.047027
-50	0.229072	0.177877	0.138124	0.107255	0.083285	0.064672	0.050219	0.038996	0.030281	0.023513
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration									
	Distance from Source									

Figure K.9
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,3,5-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.221000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

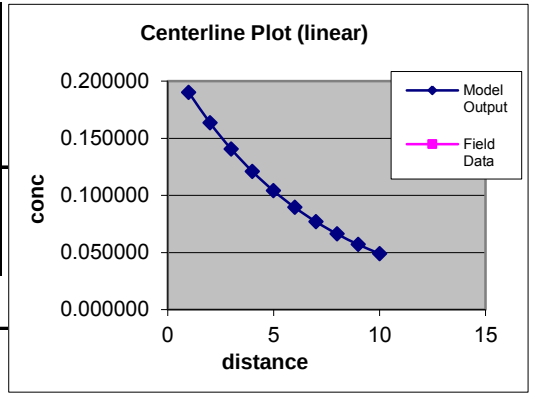
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	660.00	5.00E-03	17.24071429	0.013920537

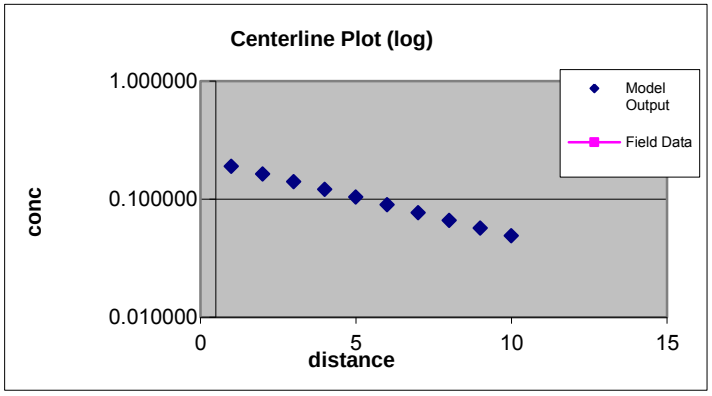
Point Concentration

x(ft)	y(ft)	z(ft)
9.466711	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	9.466711497	0	0
at	1E+99	days =	

0.053000 mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	10
Width (ft)	100

	1	2	3	4	5	6	7	8	9	10
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.095029	0.081725	0.070283	0.060442	0.051980	0.044703	0.038444	0.033061	0.028433	0.024452
0	0.190059	0.163449	0.140565	0.120885	0.103960	0.089405	0.076888	0.066123	0.056865	0.048904
-50	0.095029	0.081725	0.070283	0.060442	0.051980	0.044703	0.038444	0.033061	0.028433	0.024452
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration								
	Distance from Source								

Figure K.9
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

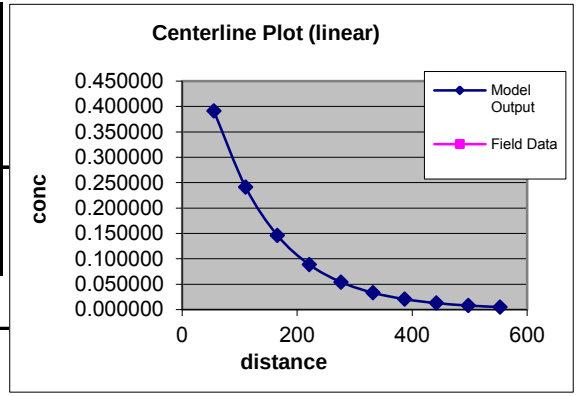
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.605000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

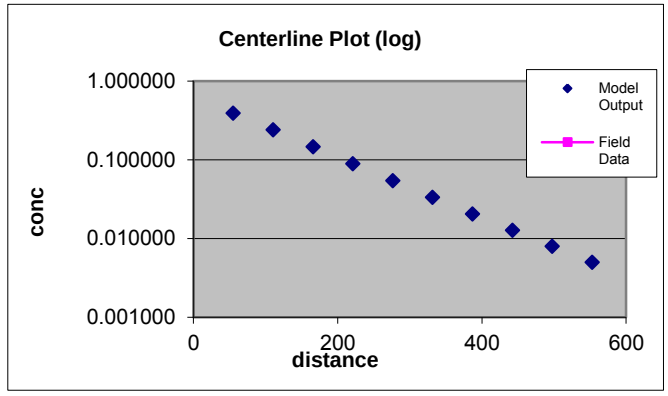
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	58.00	5.00E-03	2.427214286	0.098878785

Point Concentration

x(ft)	y(ft)	z(ft)
552.008342	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	552.0083417	0	0
at	1E+99	days =	**0.005000**
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	553
Width (ft)	100

	55.3	110.6	165.9	221.2	276.5	331.8	387.1	442.4	497.7	553
100	0.001607	0.007878	0.010584	0.010114	0.008377	0.006438	0.004730	0.003373	0.002357	0.001622
50	0.197003	0.128275	0.083366	0.053971	0.034801	0.022369	0.014346	0.009187	0.005879	0.003760
0	0.390792	0.240841	0.145939	0.088595	0.054093	0.033227	0.020520	0.012732	0.007932	0.004958
-50	0.197003	0.128275	0.083366	0.053971	0.034801	0.022369	0.014346	0.009187	0.005879	0.003760
-100	0.001607	0.007878	0.010584	0.010114	0.008377	0.006438	0.004730	0.003373	0.002357	0.001622
Field Data:	Centerline C	Concentration								
	Distance from Source									

Figure K.9
SIM 4

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: MTBE

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.026600	3.23E+01	3.23E+00	1.00E-04	1.890E-03	100	36	1E+99

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	12.00	5.00E-03	1.295285714	0.185287306

NEW QUICK_DOMENICO.XLS

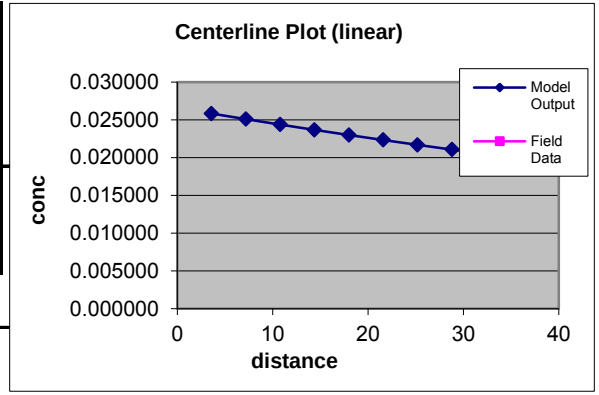
SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

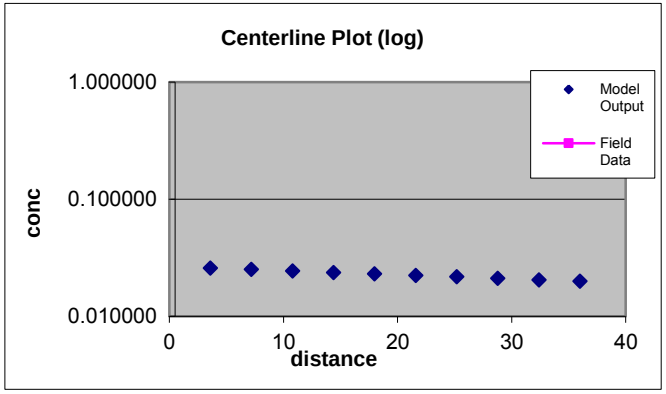
Point Concentration

x(ft)	y(ft)	z(ft)
35.142801	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	35.14280067	0	0
at	1E+99	days =	

0.020000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 36
Width (ft) 100

	3.6	7.2	10.8	14.4	18	21.6	25.2	28.8	32.4	36
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000003	0.000006	0.000010
50	0.012918	0.012548	0.012187	0.011838	0.011498	0.011168	0.010847	0.010536	0.010234	0.009940
0	0.025837	0.025095	0.024375	0.023675	0.022996	0.022335	0.021693	0.021067	0.020456	0.019859
-50	0.012918	0.012548	0.012187	0.011838	0.011498	0.011168	0.010847	0.010536	0.010234	0.009940
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000003	0.000006	0.000010
Field Data:	Centerline C Concentration									
	Distance from Source									

Figure K.10
Quick Domenico
Fate and Transport Model Input and Output
RW-710
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				**Data Source**
Source Identification (or Well ID)			RW-710	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			1,2,4-Trimethylbenzene
Source Concentration (mg/l)		mg/l	1.370000
Lambda (per day)		day^{-1}	0.012328767
KOC			2200
Sim 2			
Contaminant			1,3,5-Trimethylbenzene
Source Concentration (mg/l)		mg/l	0.470000
Lambda (per day)		day^{-1}	0.012328767
KOC			660
Sim 3			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	1.440000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 4			
Contaminant			Ethylbenzene
Source Concentration (mg/l)		mg/l	0.768000
Lambda (per day)		day^{-1}	0.003041096
KOC			220
Sim 5			
Contaminant			Naphthalene
Source Concentration (mg/l)		mg/l	0.196000
Lambda (per day)		day^{-1}	0.002684932
KOC			950

Output				
Contaminant	**Starting Concentration (mg/l)**	**Screening Criteria (mg/l)**	**Predicted Concentration (mg/l)**	**Distance to Meet Screening Criteria (ft)**
Sim 1 - 1,2,4-Trimethylbenzene	1.370000	0.062000	0.062000	11.013986
Sim 2 - 1,3,5-Trimethylbenzene	0.470000	0.053000	0.053000	14.469472
Sim 3 - Benzene	1.440000	0.005000	0.005000	654.971015
Sim 4 - Ethylbenzene	0.768000	0.700000	0.700000	2.504679
Sim 5 - Naphthalene	0.196000	0.100000	0.100000	8.660735

Figure K.10
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,2,4-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

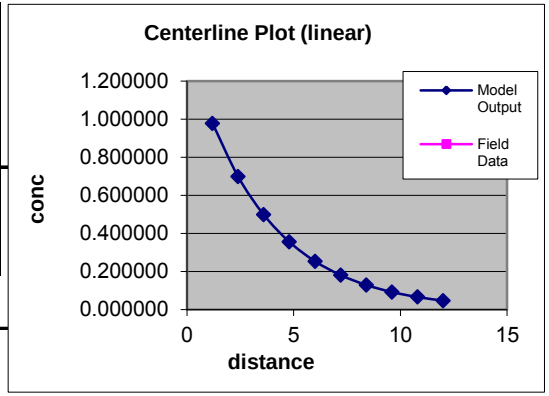
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.370000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

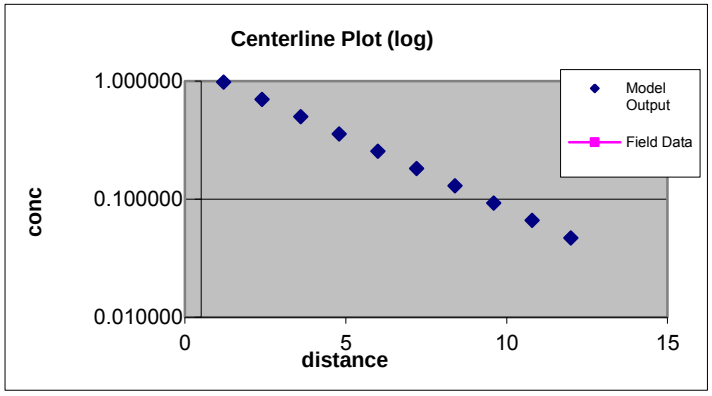
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	2,200.00	5.00E-03	55.13571429	0.004352895

Point Concentration

x(ft)	y(ft)	z(ft)
11.013986	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	11.01398635	0	0
at	1E+99	days =	0.062000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 12
Width (ft) 100

	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.488903	0.348943	0.249050	0.177754	0.126868	0.090549	0.064627	0.046126	0.032922	0.023497
0	0.977806	0.697887	0.498100	0.355508	0.253735	0.181098	0.129254	0.092252	0.065843	0.046994
-50	0.488903	0.348943	0.249050	0.177754	0.126868	0.090549	0.064627	0.046126	0.032922	0.023497
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.10
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: 1,3,5-Trimethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

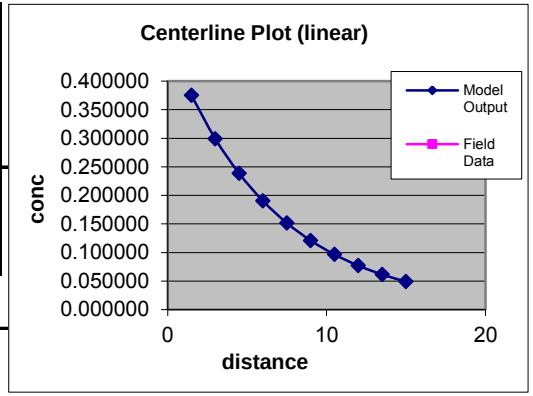
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.470000	3.23E+01	3.23E+00	1.00E-04	1.233E-02	100	36	1E+99

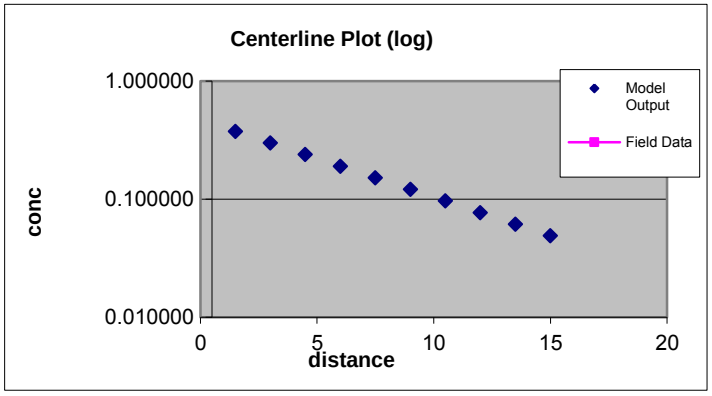
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	660.00	5.00E-03	17.24071429	0.013920537

Point Concentration

x(ft)	y(ft)	z(ft)
14.469472	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	14.46947156	0	0
at	1E+99	days =	
			0.053000
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	15
Width (ft)	100

	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.187418	0.149470	0.119205	0.095069	0.075819	0.060468	0.048224	0.038460	0.030673	0.024462
0	0.374835	0.298939	0.238411	0.190138	0.151639	0.120935	0.096449	0.076920	0.061345	0.048924
-50	0.187418	0.149470	0.119205	0.095069	0.075819	0.060468	0.048224	0.038460	0.030673	0.024462
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.10
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

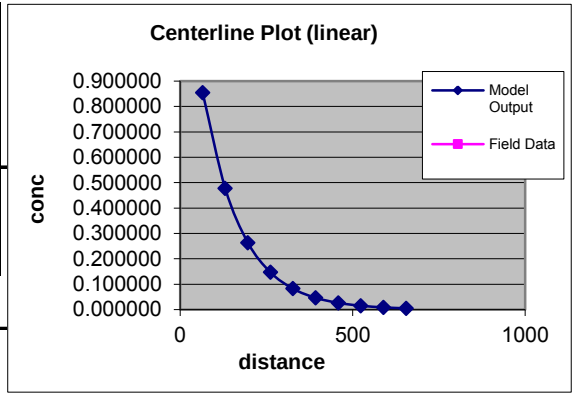
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.440000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

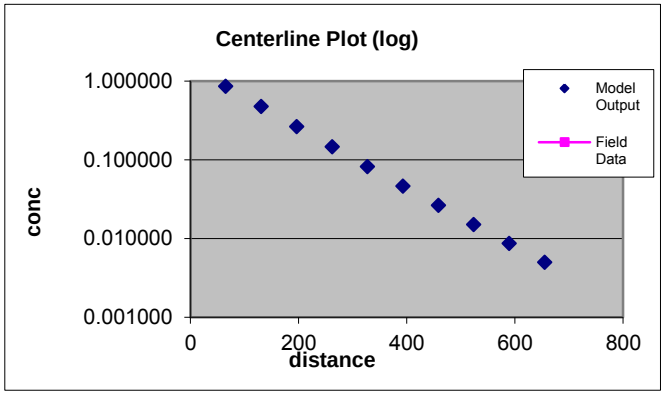
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	58.00	5.00E-03	2.427214286	0.098878785

Point Concentration

x(ft)	y(ft)	z(ft)
654.971015	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	654.9710149	0	0
at	1E+99	days =	0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 655
Width (ft) 100

	65.5	131	196.5	262	327.5	393	458.5	524	589.5	655
100	0.006529	0.022329	0.025173	0.021139	0.015670	0.010872	0.007246	0.004704	0.002998	0.001886
50	0.433238	0.260535	0.156076	0.092964	0.055108	0.032562	0.019203	0.011313	0.006663	0.003923
0	0.853419	0.476717	0.263368	0.146444	0.082123	0.046406	0.026393	0.015092	0.008669	0.004999
-50	0.433238	0.260535	0.156076	0.092964	0.055108	0.032562	0.019203	0.011313	0.006663	0.003923
-100	0.006529	0.022329	0.025173	0.021139	0.015670	0.010872	0.007246	0.004704	0.002998	0.001886
Field Data:	Centerline C	Concentration								
	Distance from Source									

Figure K.10
SIM 4

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Ethylbenzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.768000	3.23E+01	3.23E+00	1.00E-04	3.041E-03	100	36	1E+99

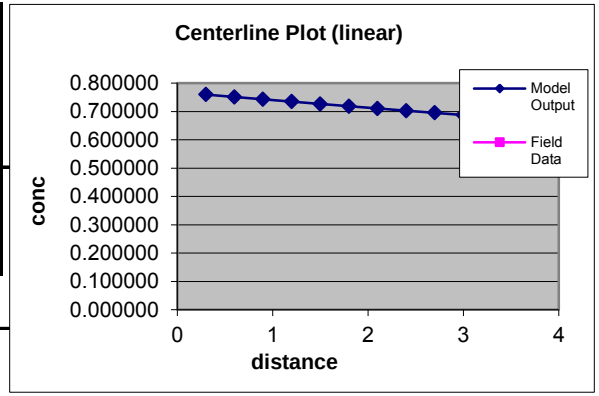
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	220.00	5.00E-03	6.413571429	0.037420648

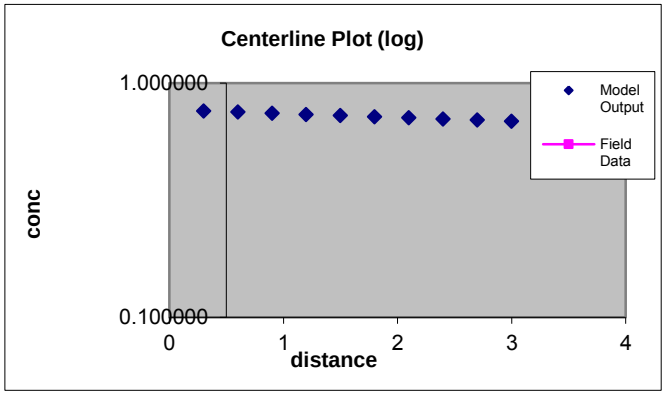
Point Concentration

x(ft)	y(ft)	z(ft)
2.504679	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	2.504678559	0	0
at	1E+99	days =	

0.700000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 3
Width (ft) 100

	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.379760	0.375566	0.371419	0.367317	0.363261	0.359249	0.355282	0.351359	0.347479	0.343642
0	0.759519	0.751132	0.742837	0.734634	0.726521	0.718499	0.710564	0.702717	0.694957	0.687283
-50	0.379760	0.375566	0.371419	0.367317	0.363261	0.359249	0.355282	0.351359	0.347479	0.343642
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data:	Centerline C Concentration									
	Distance from Source									

Figure K.10
SIM 5

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Naphthalene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.196000	3.23E+01	3.23E+00	1.00E-04	2.685E-03	100	36	1E+99

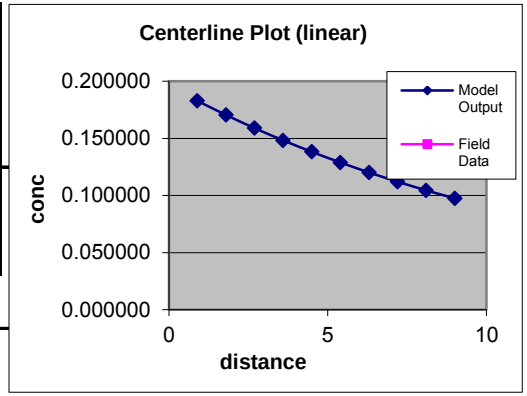
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	950.00	5.00E-03	24.37678571	0.009845433

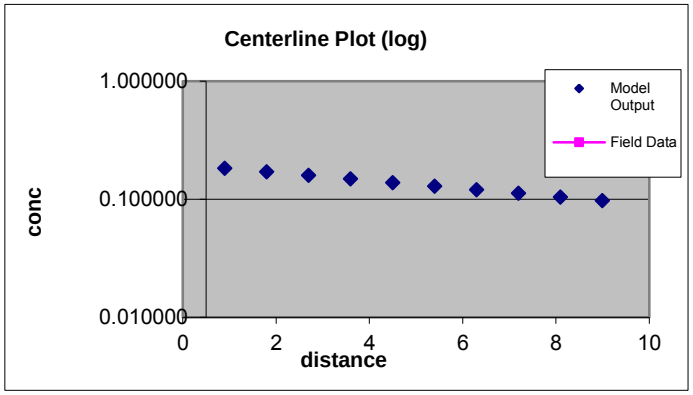
Point Concentration

x(ft)	y(ft)	z(ft)
8.660735	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	8.66073462	0	0
at	1E+99	days =	

0.100000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 9
Width (ft) 100

	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.091381	0.085209	0.079454	0.074087	0.069083	0.064417	0.060067	0.056010	0.052227	0.048699
0	0.182762	0.170418	0.158908	0.148175	0.138167	0.128835	0.120133	0.112019	0.104453	0.097398
-50	0.091381	0.085209	0.079454	0.074087	0.069083	0.064417	0.060067	0.056010	0.052227	0.048699
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data: Centerline C Concentration
Distance from Source

Figure K.11
Quick Domenico
Fate and Transport Model Input and Output
S-243
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-243	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzo(a)pyrene
Source Concentration (mg/l)		mg/l	0.001120
Lambda (per day)		day^{-1}	0.000657534
KOC			910000
Sim 2			
Contaminant			Benzo(b)fluoranthene
Source Concentration (mg/l)		mg/l	0.001290
Lambda (per day)		day^{-1}	0.000575342
KOC			550000
Sim 3			
Contaminant			Benzo(g,h,i)perylene
Source Concentration (mg/l)		mg/l	0.000850
Lambda (per day)		day^{-1}	0.000520548
KOC			2800000

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzo(a)pyrene	0.001120	0.000200	0.000200	1.264128
Sim 2 - Benzo(b)fluoranthene	0.001290	0.001200	0.001200	0.073280
Sim 3 - Benzo(g,h,i)perylene	0.000850	0.000260	0.000260	0.554682

Figure K.11
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(a)pyrene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

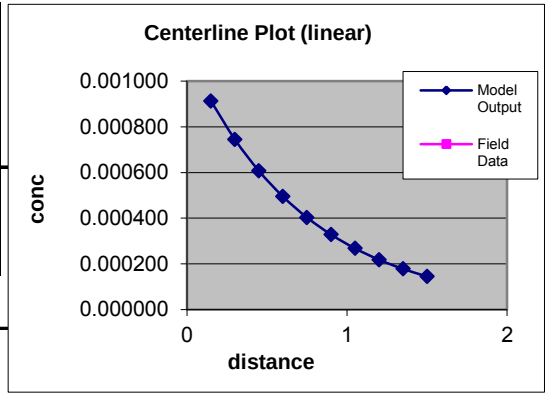
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.001120	3.23E+01	3.23E+00	1.00E-04	6.575E-04	100	36	1E+99

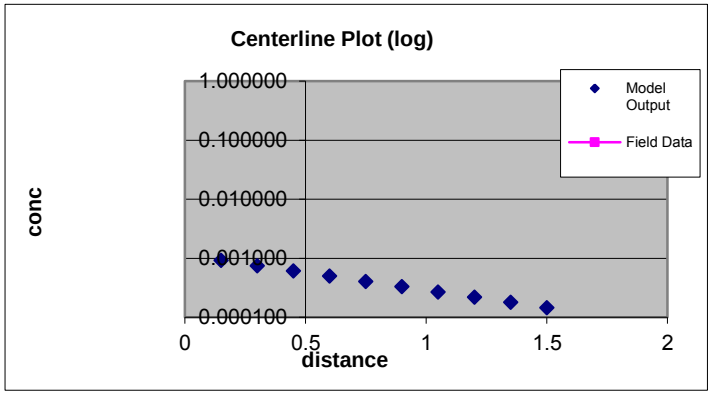
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	910,000.00	5.00E-03	22393.5	1.07174E-05

Point Concentration

x(ft)	y(ft)	z(ft)
1.264128	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	1.264127993	0	0
at	1E+99	days =	0.000200
			mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 1.5
Width (ft) 100

	0.15	0.3	0.45	0.6	0.75	0.9	1.05	1.2	1.35	1.5
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000456	0.000372	0.000303	0.000247	0.000202	0.000164	0.000134	0.000109	0.000089	0.000073
0	0.000913	0.000744	0.000607	0.000494	0.000403	0.000329	0.000268	0.000218	0.000178	0.000145
-50	0.000456	0.000372	0.000303	0.000247	0.000202	0.000164	0.000134	0.000109	0.000089	0.000073
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration								
	Distance from Source								

Figure K.11
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(b)fluoranthene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

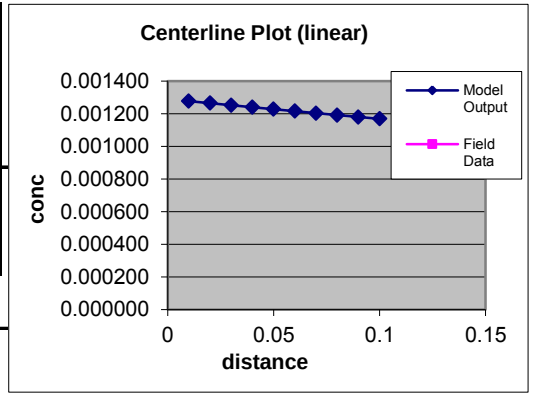
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.001290	3.23E+01	3.23E+00	1.00E-04	5.753E-04	100	36	1E+99

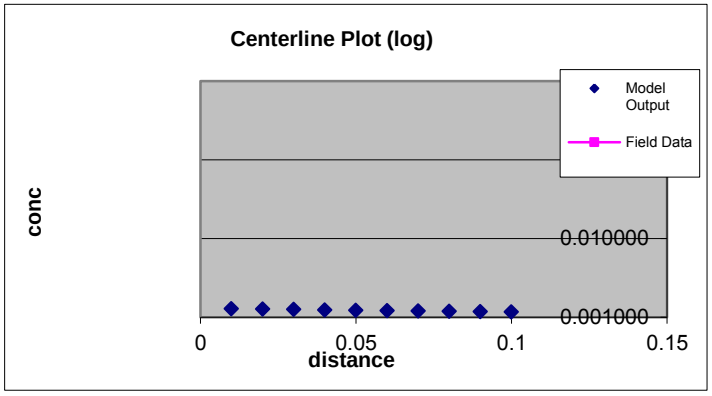
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	550,000.00	5.00E-03	13534.92857	1.77319E-05

Point Concentration

x(ft)	y(ft)	z(ft)
0.073280	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	0.073280004	0	0
at	1E+99	days =	**0.001200**
			mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	0.1
Width (ft)	100

	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000639	0.000632	0.000626	0.000620	0.000614	0.000608	0.000602	0.000596	0.000590	0.000584
0	0.001277	0.001265	0.001252	0.001240	0.001228	0.001216	0.001204	0.001192	0.001180	0.001169
-50	0.000639	0.000632	0.000626	0.000620	0.000614	0.000608	0.000602	0.000596	0.000590	0.000584
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration								
	Distance from Source								

Figure K.11
SIM 3

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzo(g,h,i)perylene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

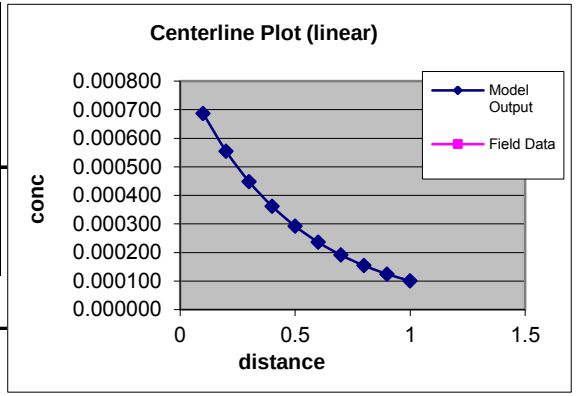
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.000850	3.23E+01	3.23E+00	1.00E-04	5.205E-04	100	36	1E+99

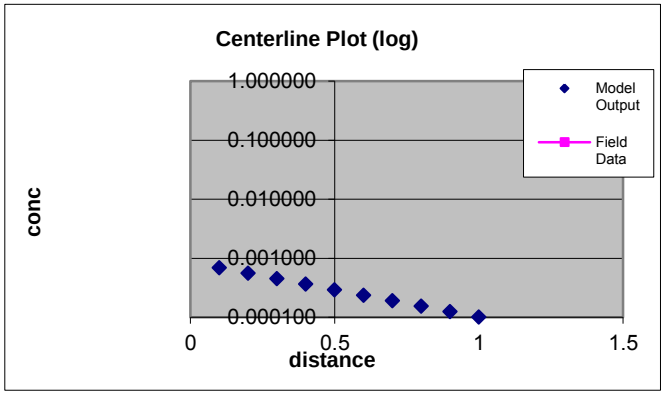
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	##########	5.00E-03	68901	3.48326E-06

Point Concentration

x(ft)	y(ft)	z(ft)
0.554682	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	0.554682421	0	0
at	1E+99	days =	0.000260 mg/l





AREAL MODEL DOMAIN
Length (ft) 1
Width (ft) 100

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	0.000343	0.000277	0.000224	0.000181	0.000146	0.000118	0.000095	0.000077	0.000062	0.000050
0	0.000687	0.000555	0.000448	0.000362	0.000292	0.000236	0.000191	0.000154	0.000124	0.000100
-50	0.000343	0.000277	0.000224	0.000181	0.000146	0.000118	0.000095	0.000077	0.000062	0.000050
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C	Concentration							
	Distance from Source								

Figure K.12
Quick Domenico
Fate and Transport Model Input and Output
S-329
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-329	
Sample Date			Jun-13	June 2013 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	0.008600
Lambda (per day)		day^{-1}	0.000958904
KOC			58

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzene	0.008600	0.005000	0.005000	67.740764

Figure K.12
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

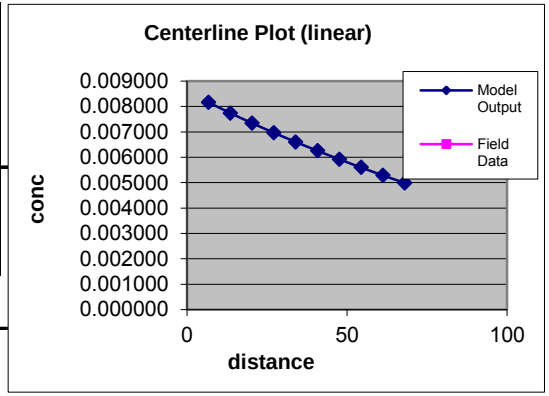
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.008600	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

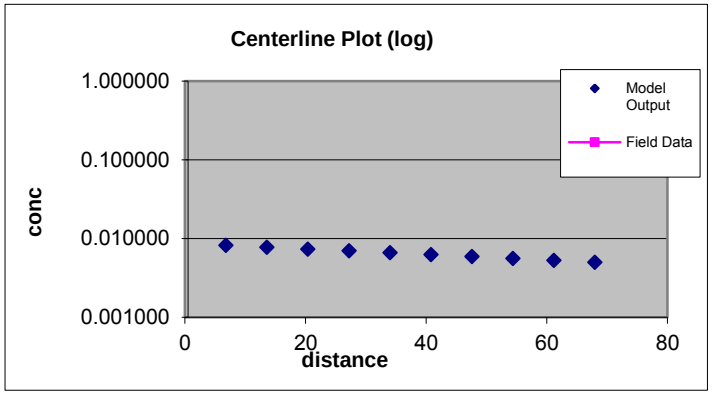
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	58.00	5.00E-03	2.427214286	0.098878785

Point Concentration

x(ft)	y(ft)	z(ft)
67.740764	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	67.74076375	0	0
at	1E+99	days =	0.005000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 68
Width (ft) 100

	6.8	13.6	20.4	27.2	34	40.8	47.6	54.4	61.2	68
100	0.000000	0.000000	0.000000	0.000001	0.000002	0.000006	0.000013	0.000022	0.000032	0.000043
50	0.004079	0.003870	0.003671	0.003482	0.003303	0.003134	0.002973	0.002820	0.002675	0.002538
0	0.008158	0.007739	0.007342	0.006963	0.006602	0.006254	0.005920	0.005597	0.005287	0.004989
-50	0.004079	0.003870	0.003671	0.003482	0.003303	0.003134	0.002973	0.002820	0.002675	0.002538
-100	0.000000	0.000000	0.000000	0.000001	0.000002	0.000006	0.000013	0.000022	0.000032	0.000043
Field Data:	**Centerline C Concentration**									
	Distance from Source									

Figure K.13
Quick Domenico
Fate and Transport Model Input and Output
S-224
AOI 4 PES Facility
Philadelphia, Pennsylvania

Project	AOI 4 PES Facility
Prepared by	ED
Date Prepared	10/4/2013

Generic Input Parameters				Data Source
Source Identification (or Well ID)			S-224	
Sample Date			May-05	May 2005 sampling event
Source Width		ft	100	100' default if no plume present
Source Thickness		ft	36	Maximum thickness of alluvium/fill
Longitudinal Dispersivity	A_x	ft	32.3	Xu and Eckstein (1995) formula assuming 2000 ft plume length
Transverse Dispersivity	A_y	ft	3.23	Quick Domenico User's Guide
Vertical Dispersivity	A_z	ft	0.0001	Quick Domenico User's Guide
Hydraulic Conductivty	k	ft/day	24	Highest K URS 2002 Aquifer testing
Hydraulic Gradient		ft/ft	0.0035	Historical Hydraulic Gradient from 2005 SCR
Porosity		decimal fraction	0.35	Site soil analysis
Soil Bulk Density	p_b	g/cm3	1.7225	Quick Domenico User's Guide
Fraction of Organic Carbon	f_{OC}	decimal fraction	0.005	Quick Domenico User's Guide
Time		days	1.00E+99	Steady-state conditions

Chemical Specific Input Parmaters			
Sim 1			
Contaminant			Benzene
Source Concentration (mg/l)		mg/l	2.000000
Lambda (per day)		day^{-1}	0.000958904
KOC			58
Sim 2			
Contaminant			Toluene
Source Concentration (mg/l)		mg/l	2.800000
Lambda (per day)		day^{-1}	0.024684932
KOC			130

Output

Contaminant	Starting Concentration (mg/l)	Screening Criteria (mg/l)	Predicted Concentration (mg/l)	Distance to Meet Screening Criteria (ft)
Sim 1 - Benzene	2.000000	0.005000	0.004998	694.283737
Sim 2 - Toluene	2.800000	1.000000	0.999999	10.175748

Figure K.13
SIM 1

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Benzene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

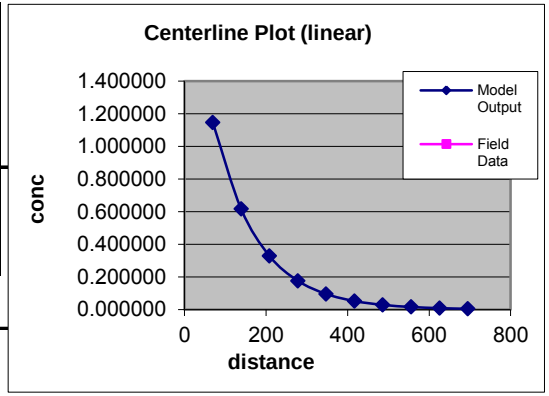
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
2.000000	3.23E+01	3.23E+00	1.00E-04	9.589E-04	100	36	1E+99

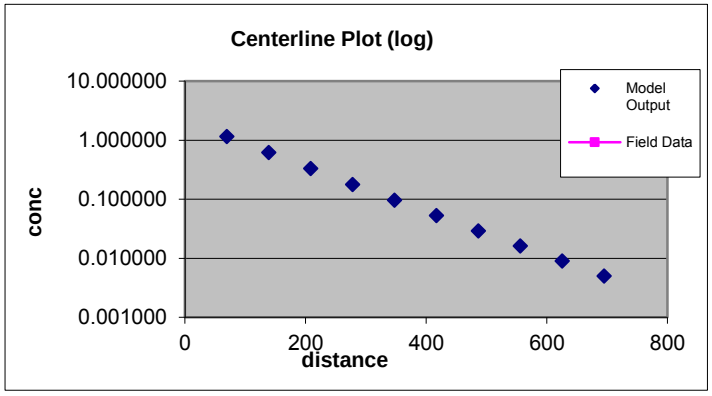
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	58.00	5.00E-03	2.427214286	0.098878785

Point Concentration

x(ft)	y(ft)	z(ft)
694.283737	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	694.2837372	0	0
at	1E+99	days =	0.004998 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 695
Width (ft) 100

	69.5	139	208.5	278	347.5	417	486.5	556	625.5	695
100	0.010668	0.032396	0.034347	0.027519	0.019571	0.013063	0.008390	0.005253	0.003232	0.001964
50	0.583339	0.339998	0.197225	0.113677	0.065197	0.037275	0.021274	0.012132	0.006917	0.003944
0	1.145344	0.615781	0.328294	0.176458	0.095744	0.052377	0.028849	0.015980	0.008893	0.004968
-50	0.583339	0.339998	0.197225	0.113677	0.065197	0.037275	0.021274	0.012132	0.006917	0.003944
-100	0.010668	0.032396	0.034347	0.027519	0.019571	0.013063	0.008390	0.005253	0.003232	0.001964
Field Data:	Centerline C Concentration									
	Distance from Source									

Figure K.13
SIM 2

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: AOI 4 PES Facility
Date: 10/4/2013 Prepared by: ED
Contaminant: Toluene

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF
"AN ANALYTICAL MODEL FOR
MULTIDIMENSIONAL TRANSPORT OF A
DECAYING CONTAMINANT SPECIES"
P.A. Domenico (1987)
Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
2.800000	3.23E+01	3.23E+00	1.00E-04	2.468E-02	100	36	1E+99

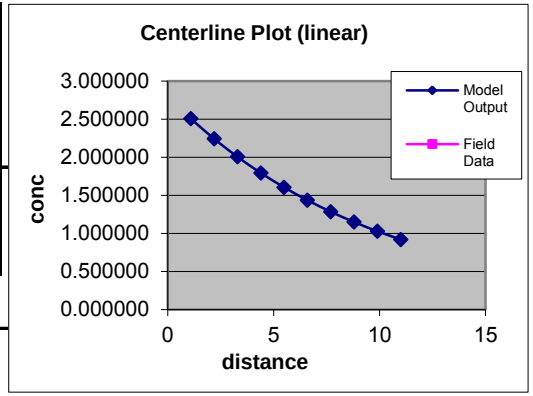
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
2.40E+01	0.0035	0.35	1.72	130.00	5.00E-03	4.198928571	0.057157438

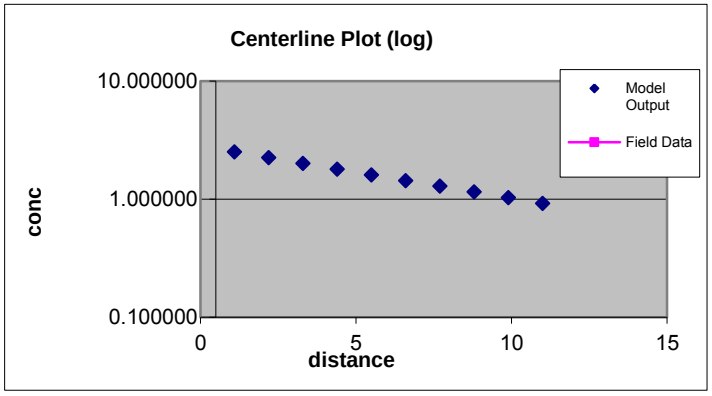
Point Concentration

x(ft)	y(ft)	z(ft)
10.175748	0.000000	0.000000

	x(ft)	y(ft)	z(ft)
Conc. At	10.17574847	0	0
at	1E+99	days =	

0.999999 mg/l





AREAL MODEL	CALCULATION DOMAIN
Length (ft)	11
Width (ft)	100

	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11
100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	1.252536	1.120604	1.002569	0.896967	0.802488	0.717961	0.642337	0.574678	0.514147	0.459991
0	2.505072	2.241208	2.005138	1.793934	1.604976	1.435921	1.284673	1.149357	1.028293	0.919981
-50	1.252536	1.120604	1.002569	0.896967	0.802488	0.717961	0.642337	0.574678	0.514147	0.459991
-100	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Field Data:	Centerline C Concentration								
	Distance from Source								

APPENDIX L

Development of Site-Specific Standards and Risk Assessment

APPENDIX L
DEVELOPMENT OF SITE-SPECIFIC STANDARDS
AOI 4: PES FACILITY
PHILADELPHIA, PENNSYLVANIA

Based on the current and future intended non-residential site use, an exposure assessment was conducted for any compounds in shallow soils (0-2 feet bgs) or deep soils (2-15 feet bgs) that exceeded the non-residential statewide health soil medium specific standard (MSC). Potential human health exposures for the Facility are for an industrial worker scenario.

Direct contact exposure pathways to shallow soil, groundwater, and light non-aqueous phase liquid (LNAPL) is being evaluated under the industrial use scenario because Sunoco has well documented standards for personal protective equipment (PPE) and procedures for soil excavation and handling. However, because direct contact to soils could occur outside of excavation activities, soil samples were collected to further evaluate the potential for unacceptable risk of exposure.

Based on the data collected between 2004 and 2013, concentrations of benzene, lead, naphthalene, toluene, and ethylene dibromide were detected in shallow soils above the non-residential soil MSC and concentrations of benzene, lead, naphthalene, ethylbenzene, ethylene dibromide, 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-trimethylbenzene (1,3,5-TMB) were detected in deep soils above the non-residential soil MSC. To refine the list of compounds carried forward in the risk assessment, the compounds listed above were further screened against the EPA Region III Risk-Based Concentrations (aka, EPA Regional Screening Levels [RSLs]) in accordance with Section IV of the PADEP's Technical Guidance Manual (TGM) (dated June 8, 2002). Based on this screening, concentrations of 1,3,5-TMB, 1,2,4-TMB, toluene, ethylene dibromide and ethylbenzene were below the EPA RSLs for industrial soil and were, therefore, eliminated from the risk assessment. Concentrations of benzene, lead and naphthalene were above the EPA RSLs and were, therefore, further evaluated as outlined in the January 2013 Soil Screening Procedure for Philadelphia Energy Solutions memorandum (Sunoco 2013).

As described in the January 2013 memorandum, the compounds that exceeded both the non-residential statewide health standards and EPA RSLs were compared to the PADEP's Non-Residential Direct Contact MSC. To maintain conservatism, all soil samples (surface and subsurface) were screened against the more stringent 0-2 feet below grade direct contact criteria regardless of sample depth in the event that soils are re-used elsewhere on the Facility. Based on this screening, concentrations of benzene and naphthalene were eliminated from the risk assessment. The analyte identified for further risk assessment is lead. Since most lead-based human health effects data are based on blood-lead concentrations instead of external dose, the traditional approach for risk assessment is not applied to characterize exposure to lead.

Lead

A site-specific screening level for lead was calculated based on ingestion as presented in 25 Pa. Code § 250.306(e), Appendix A, Table 7. As described in 25 Pa. Code § 250.306(e), the non-residential soil screening value for lead is based on the method presented in the report 'The Society for Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil' (Wixson, 1991). The model used by the PADEP and developed by SEGH was also used to calculate the site specific criterion for the Facility. Based on the SEGH model and PADEP's default parameters, PADEP's non-residential direct contact MSC default value for lead in shallow soil is 1,000 milligrams per kilograms (mg/kg). To develop a site-specific criteria for lead, the values used by PADEP for the target blood lead concentration (T) and geometric mean background blood lead concentration (B) were revised in consideration of site-specific conditions and updated lead data collected by the US Center for Disease Control and Prevention (CDC). Revised values for these parameters have been approved by PADEP in previous Site Characterization Reports for the Sunoco Philadelphia Refinery and are discussed below:

Target blood lead concentration (T) – The default target blood lead concentration used by the PADEP to develop the non-residential MSC is 20 micrograms per deciliter (ug/dL); however, the Center for Disease Control (CDC) recommends that worker blood lead levels be maintained below 25 ug/dL (NIOSH, 2008) to prevent

adverse health effects for most workers from exposure to lead throughout a working lifetime. Based on conversations between representatives of Sunoco and EPA, the target lead blood level identified by the CDC is the level used in the site-specific calculations in Table L-2.

Geometric mean background blood lead concentration (B) – B is the background blood lead concentration in the target population from sources other than soil and dust. The PADEP's default value for B is 4 ug/dL and, as summarized in PADEPs reference document (Wixson, 1991), is based on data gathered in the United Kingdom from young children. The CDC has monitored blood lead levels in US children and adults since 1976 and, based on the most recent results published by the National Center for Environmental Health of the CDC (NCEH, Page I-3 2005), the mean blood lead concentration for an adult 20 years of age or older is 1.56 ug/dL. Based on the more recent study by the US CDC, the value used for B in the site specific calculation has been revised to 1.56 ug/dL.

As presented in Table L-2, based on the revised parameters, the derived site-specific standard for lead in soil is 1,708 mg/kg for a Facility worker. Three shallow soil samples (S-381_0-5, BH-13_103_0-1 and BH-13-99_1.5-2) and three deep soil samples (S-381_2-3, BH-13-86_5.5-6 and BH-13-99_2.5-3) have concentrations of lead above the site specific criteria and will be delineated and remediated as described in the Clean-up Plan.

Conclusions

Concentrations of lead detected in shallow and subsurface soil samples collected in AOI-4 were above the non-residential soil MSC, EPA RSL, non-residential direct contact MSC and site-specific screening level and therefore, required additional review. Soil sample locations with concentrations above the site-specific screening levels will be delineated and remediated as described in the Clean-up Plan.

References

NCEH. (2005). Third National Report on Human Exposure to Environmental Chemicals. Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences. Atlanta, Georgia. NCEH. Pub. No. 05-0570.

NIOSH (2008). Adult Blood Lead Epidemiology and Surveillance (ABLES). http://www.cdc.gov/niosh/topics/ABLES

Sunoco (2013). Soil Screening Procedure for Philadelphia Energy Solutions, Philadelphia Refinery.

Wixson, B.G., (1991). The Society of Environmental Geochemistry and Health (SEGH) Task Force Approach to the Assessment of Lead in Soil. Trace Substances in Environmental Health. 11-20.

Table L-1:
Risk / Exposure Evaluation

					Lead	
					7439-92-1	
Location ID	Sample ID	Sample Top (ft)	Sample Bottom (ft)	Sample Date	Reported Result (mg/kg)	Target Blood Lead Level
AOI4_BH-13-81	AOI-4_BH-13-81_8-10'	8	10	3/20/2013	2.5	2.7
AOI4_BH-13-90	AOI-4_BH-13-90_8-10'_031513	8	10	3/15/2013	8.6	2.8
AOI4_BH-13-94	AOI-4_BH-13-94_0-2_031513	0	2	3/15/2013	43.8	3.3
AOI4_BH-13-94	AOI-4_BH-13-94_8-10_031513	8	10	3/15/2013	6.2	2.8
AOI4-BH-13-100	AOI4-BH-13-100_0-1_31813	0	1	3/18/2013	399	7.9
AOI4-BH-13-100	AOI4-BH-13-100_5-6_31813	5	6	3/18/2013	12.8	2.9
AOI4-BH-13-101	AOI4-BH-13-101_0-1_31813	0	1	3/18/2013	494	9.2
AOI4-BH-13-101	AOI4-BH-13-101_7-8_31813	7	8	3/18/2013	10.2	2.8
AOI4-BH-13-102	AOI4-BH-13-102_0-1_31813	0	1	3/18/2013	1620	23.8
AOI4-BH-13-102	AOI4-BH-13-102_6-7_31813	6	7	3/18/2013	9.2	2.8
AOI4-BH-13-103	AOI4-BH-13-103_0-1_31813	0	1	3/18/2013	3020	**42.1**
AOI4-BH-13-103	AOI4-BH-13-103_2-3_31813	2	3	3/18/2013	34	3.2
AOI4-BH-13-104	AOI4-BH-13-104_0-.5_31513	0	0.5	3/15/2013	7	2.8
AOI4-BH-13-104	AOI4-BH-13-104_6-7_31513	6	7	3/15/2013	7.9	2.8
AOI4-BH-13-82	AOI4-BH-13-82_6.5-7_031813	6.5	7	3/18/2013	13.3	2.9
AOI4-BH-13-84	AOI4-BH-13-84_5.5-6_031513	5.5	6	3/15/2013	6.6	2.8
AOI4-BH-13-85	AOI4-BH-13-85_5.5-6_031513	5.5	6	3/15/2013	6.9	2.8
AOI4-BH-13-86	AOI4-BH-13-86_2-2.5_031513	2	2.5	3/15/2013	7.8	2.8
AOI4-BH-13-86	AOI4-BH-13-86_5.5-6_031513	5.5	6	3/15/2013	2140	**30.6**
AOI4-BH-13-88	AOI4-BH-13-88_1.5-2_31413	1.5	2	3/14/2013	10	2.8
AOI4-BH-13-88	AOI4-BH-13-88_3.5-4_031413	3.5	4	3/14/2013	7.1	2.8
AOI4-BH-13-88	AOI4-BH-13-88_5.5-6_031413	5.5	6	3/14/2013	6.2	2.8
AOI4-BH-13-89	AOI4-BH-13-89_5.5-6_031913	5.5	6	3/19/2013	6.7	2.8
AOI4-BH-13-91	AOI4-BH-13-91_0-2'_031413	0	2	3/14/2013	60.8	3.5
AOI4-BH-13-91	AOI4-BH-13-91_8-10'_031413	8	10	3/14/2013	7.3	2.8
AOI4-BH-13-92	AOI4-BH-13-92_8-10'	8	10	3/18/2013	11.6	2.9
AOI4-BH-13-93	AOI4-BH-13-93_8-10'	8	10	3/18/2013	10.7	2.9
AOI4-BH-13-95	AOI4-BH-13-95_8-10'	8	10	3/18/2013	5.5	2.8
AOI4-BH-13-96	AOI4-BH-13-96_8-9_31413	8	9	3/14/2013	26.2	3.1
AOI4-BH-13-97	AOI4-BH-13-97.0-1_31413	0	1	3/14/2013	81.5	3.8
AOI4-BH-13-97	AOI4-BH-13-97-8.5-9.5_31413	8.5	9.5	3/14/2013	2.9	2.8
AOI4-BH-13-98	AOI4-BH-13-98_6-7_31413	6	7	3/14/2013	8	2.8
AOI4-BH-13-98	AOI4-BH-13-98-1-2_31413	1	2	3/14/2013	136	4.5
AOI4-BH-13-99	AOI4-BH-13-99_1.5-2_031813	1.5	2	3/18/2013	11600	**154.0**
AOI4-BH-13-99	AOI4-BH-13-99_2.5-3_031813	2.5	3	3/18/2013	1870	**27.1**
PB-847-AST-847-1	AST-847-1/0-0.5_10/16/2006	0	0.5	10/16/2006	268	6.2
PB-847-AST-847-2	AST-847-2/0-0.5_10/16/2006	0	0.5	10/16/2006	185	5.1
PB-847-AST-847-3	AST-847-3/0-0.5_10/16/2006	0	0.5	10/16/2006	177	5.0
PB-847-AST-847-4	AST-847-4/0-0.5_10/16/2006	0	0.5	10/16/2006	35.1	3.2
PB-847-AST-847-5	AST-847-5/0-0.5_10/16/2006	0	0.5	10/16/2006	154	4.7
PB-847-AST-847-6	AST-847-6/0-0.5_10/16/2006	0	0.5	10/16/2006	15.8	2.9
S-216	BH-S216-032505-1-1.5	1	1.5	3/25/2005	60.8	3.5
S-217	BH-S217-040105-1-1.5	1	1.5	4/1/2005	10.2	2.8
S-219	BH-S219-032505-1-1.5	1	1.5	3/25/2005	8.99	2.8
S-220	BH-S220-040105-1-1.5	1	1.5	4/1/2005	7.58	2.8
S-221	BH-S221-032505-1.5-2	1.5	2	3/25/2005	102	4.0
S-229	BH-S229-032505-1.5-2	1.5	2	3/25/2005	16.7	2.9
S-222	BH-S222-080405-1-1.5	1	1.5	8/4/2005	143	4.6
S-223	BH-S223-080405-1.5-2	1.5	2	8/4/2005	18.2	3.0
S-224	BH-S224-080405-1-1.5	1	1.5	8/4/2005	192	5.2
S-364	AOI4_S-364_.5-1_30413	0.5	1	3/4/2013	13	2.9
S-364	AOI4_S-364_4-5_30413	4	5	3/4/2013	15.2	2.9
S-364	S-364 @ 19'_031913	18.5	19	3/19/2013	18.5	3.0
S-365	S-365 @ 12'-14'_031813	12	14	3/18/2013	4.2	2.8
S-365	S-365_0-2'	0	2	3/4/2013	79.1	3.7
S-365	S-365_4-6'	4	6	3/4/2013	222	5.6
S-366	AOI4_S-366_0-1_30513	0	1	3/5/2013	14.2	2.9
S-366	AOI4_S-366_4.5-5.5_30513	4.5	5.5	3/5/2013	10.9	2.9
S-366	S-366@14-16_031513	14	16	3/15/2013	4.3	2.8
S-367	S-367@14'_031313	13.5	14	3/13/2013	2.6	2.7
S-367	S-367_0-2'	0	2	3/5/2013	258	6.1
S-367	S-367_031313@6'	5.5	6	3/13/2013	6.3	2.8
S-368	AOI4_S-368_0-1_30513	0	1	3/5/2013	44.3	3.3
S-368	AOI4_S-368_6-7_30513	6	7	3/5/2013	64	3.5
S-368	S-368@14'_031413	13.5	14	3/14/2013	5.5	2.8
S-369	S-369@11'_04022013	10.5	11	4/2/2013	10.7	2.9
S-369	S-369@32'_04022013	31.5	32	4/2/2013	4.4	2.8
S-369	S-369_0-2'	0	2	3/4/2013	10.5	2.9
S-369	S-369_6-8'	6	8	3/4/2013	9.5	2.8
S-369	S-369_8-10'	8	10	3/4/2013	22.2	3.0
S-370	S-370 @ 14'_04222013	13.5	14	4/22/2013	14.7	2.9
S-370	S-370-0-2	0	2	3/1/2013	9.9	2.8
S-370	S-370-8-10	8	10	3/1/2013	9.9	2.8
S-371	AOI4_S-371_1-1.5_30413	1	1.5	3/4/2013	102	4.0
S-371	AOI4_S-371_2-3_30413	2	3	3/4/2013	103	4.1
S-371	AOI4_S-371_7.5-8.5_30413	7.5	8.5	3/4/2013	8.4	2.8
S-371	S-371_18-20_40113	18	20	4/1/2013	2.6	2.7
S-372	S-372@20'_032013	19.5	20	3/20/2013	5.7	2.8
S-372	S-372_1-1.5'	1	1.5	2/28/2013	14.4	2.9
S-372	S-372_6-8'	6	8	2/28/2013	8.7	2.8
S-373	AOI4-S-373_4-6'	4	6	3/19/2013	8.5	2.8
S-379	S-379_0-2'	0	2	2/28/2013	1.5	2.7
S-379	S-379_4-5'	4	5	2/28/2013	206	5.4
S-379	S-379_8-9'	8	9	2/28/2013	10	2.8
S-380	S-380_0-2'	0	2	3/1/2013	24.3	3.0
S-380	S-380_8-10	8	10	3/1/2013	8.1	2.8
S-381	AOI4-S-381_0-.5_31513	0	0.5	3/15/2013	25800	**339.3**
S-381	AOI4-S-381_2-3_31513	2	3	3/15/2013	2650	**37.3**
S-381	S-381 @ 12'_04242013	11.5	12	4/24/2013	8.5	2.8
S-381	S-381 @ 24'_04252013	23.5	24	4/24/2013	5.6	2.8

Notes:
ND - Not Detected Above Lab Reporting Limit
(1) All soil samples collected and analyzed were unsaturated.
(2) All samples are located outside SWMU areas.
(5) Calculated based on site specific parameters provided in Table F-4. The CDC (NIOSH, 2008) recommends that blood lead levels be maintained below 25 ug/dL.

Table L-2
Derivation of Site-Specific Soil Value
for Lead[1]

Parameter	Abbreviation	Assumption	Units	Source[2]
Blood lead target concentration	T	25	ug/dL	CDC - ABLES (NIOSH, 2008)
Geometric standard deviation of the blood lead distribution	G	1.4	unitless	25 Pa. Code § 250, Appendix A Table 7
Background blood lead concentration in the population from sources other than soil or dust	B	1.56	ug/dL	NCEH Pub. No. 05-0570 (NCEH, 2005)
Number of standard deviations corresponding to the degree of protection required for the population at risk	n	1.645	unitless	25 Pa. Code § 250, Appendix A Table 7
Response of the blood lead versus soil lead relationship	δ	7.5	ug/dL blood / ug/g soil	25 Pa. Code § 250, Appendix A Table 7

Site-Specific, Non-Residential (Onsite Worker) Screening Value **1,708** **ug/g (mg/kg)**

Notes:

1. The site specific screening value for lead was calculated for ingestion based on the SEGH model as specified by 25 Pa. Code 250.306(e)

$$MSC\ (mg/kg) = \frac{[(T/G^{n}) - B] \times 1000}{\delta}$$

2. Sources for blood lead target level (T) based on conversation between James Oppenheim of Sunoco and Hon Lee of EPA in November 2010.

NIOSH (2008). Adult Blood Lead Epidemiology and Surveillance (ABLES). http://www.cdc.gov/niosh/topics/ABLES

NCEH (2005). Third National Report on Human Exposure to Environmental Chemicals. Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences. Atlanta, Georgia. NCEH. Pub. No. 05-0570.

APPENDIX M

PNDI Report Summary

LANGAN

Technical Excellence
Practical Experience
Client Responsiveness

August 29, 2013

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823-7437

Re: Potential PNDI Conflict
Philadelphia Energy Solutions Refining and Marketing LLC Facility
Philadelphia AOI-4
PNDI Search ID: 20130115386606
City of Philadelphia, Philadelphia County, Pennsylvania
Langan Project No.: 002574601

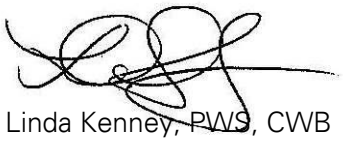
Dear Sir/Madam:

As environmental and regulatory compliance agent for Sunoco, Inc. (R&M) (applicant), Langan Engineering & Environmental Services (Langan) submits this request for potential conflicts associated with a search of the Pennsylvania Natural Diversity Inventory (PNDI) database. According to the PNDI search (PNDI 20130115386606), potential impacts may exist within the project site under the jurisdiction of the Pennsylvania Fish and Boat Commission. A Species Impact Review (SIR) Request Form is enclosed for your reference.

AOI 4 is located in the central portion of the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Facility in Philadelphia, Pennsylvania and is known as the #4 Tank Farm Area (Figure 1). AOI 4 is bordered to the North by Harntranft Street, to the South by Penrose Avenue (SR 291), to the East by AOI 3 (Impoundment Area) within the refinery, and to the East by S. 26th Street. AOI 4 encompasses approximately 105 acres (Figure 2). No surface water features are located in AOI 4.

The project is currently in the Act 2 reporting process and information related to threatened/endangered species or their habitats is required. We request information as to whether the project is determined to affect species of special concern under your jurisdiction, specifically addressing Act 2 reporting. If you have any questions on the enclosed materials or require any additional materials to make your determination, please feel free to contact me at (215) 491-6559.

Sincerely,
Langan Engineering and Environmental Services, Inc.



Linda Kenney, PWS, CWB
Senior Project Manager

Enclosure(s): As discussed

\\langan.com\data\DT\data6\2574601\Engineering Data\Natural Resources\2013 PNDIs\AOI-4\PAFBC AOI-4 PNDI Initial Conflict Letter.docx

PFBC-NESU-1 (5/2/03)

COMMONWEALTH OF PENNSYLVANIA
FISH AND BOAT COMMISSION
NATURAL DIVERSITY SECTION

SPECIES IMPACT REVIEW (SIR) REQUEST FORM

A. This form provides the site information necessary to perform a computer database search for species of special concern listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat Code or the Wildlife Code.

B. Use only ***one form*** for each proposed project or location. Complete the information below and **mail** form to:

Natural Diversity Section
PA Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823
Fax: (814) 359-5153

C. This form, a cover letter including a project narrative, and accompanying maps should be sent to the above address for environmental reviews that ***only*** concern ***reptiles, amphibians, fishes and aquatic invertebrates***. Reviews for other natural resources must be submitted to other appropriate agencies.

D. The absence of recorded information from our databases and files does not necessarily imply actual conditions on site. Future field investigations could alter this determination. The information contained in our files is routinely updated. A review is valid for one year.

E. ***Please send us only one (1) copy of your request*** – either by fax or by mail – not both. Mail is preferred to improve legibility of maps. Facsimile submission will not improve our response turn-around time.

F. ***Allow 30 days for completion of the review from the date of PFBC-NESU receipt.*** Large projects and workload may extend this review timeframe.

G. ***In any future correspondence with us following your receipt of the SIR response, please refer to the assigned SIR number at the top left of our cover letter.***

H. **FORMS THAT ARE NOT COMPLETED IN FULL WILL NOT BE REVIEWED.**

PLEASE PRINT OR TYPE: If available, provide the potential conflict **PNDI Search Number**: 20130115386606

PFBC response should be sent to:

Company/Agency: Langan Engineering & Environmental Services Form Preparer: Linda Kenney

Address: P.O. Box 1569, Doylestown, PA 18901-0219

Phone: (8:00 AM – 4:00 PM): 215-491-6500

Project Description: The project consists of approximately 105 acres. The project is currently in the Act 2 reporting process and information related to threatened/endangered species or their habitats is required.

Indicate if the project is: Transportation ☐ or Non-transportation ☒ (check one)

Will the proposed project encroach directly or indirectly (e.g., runoff) upon wetlands or waterways? Circle one for each:

Wetlands: Yes **No** Unknown Waterways: **Yes** No Unknown

County: Philadelphia Township/Municipality: City of Philadelphia

Name of the United States Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Map where project is located:

Philadelphia, PA Project size (in acres): 107

Attach an 8.5" by 11" photocopy (**DO NOT REDUCE**) of the section of the U.S.G.S. Quadrangle Map which identifies the project location. On this map, indicate the location of the project center (if linear, depict both ends) and outline the appropriate boundaries of the project area.

Specify latitude/longitude of the project center. **Latitude**: 39° / 54' / 27.9" **N**

Indicate latitude/longitude in degrees-minutes-seconds format only. **Longitude**: -75° / 11' / 42.4" **W**

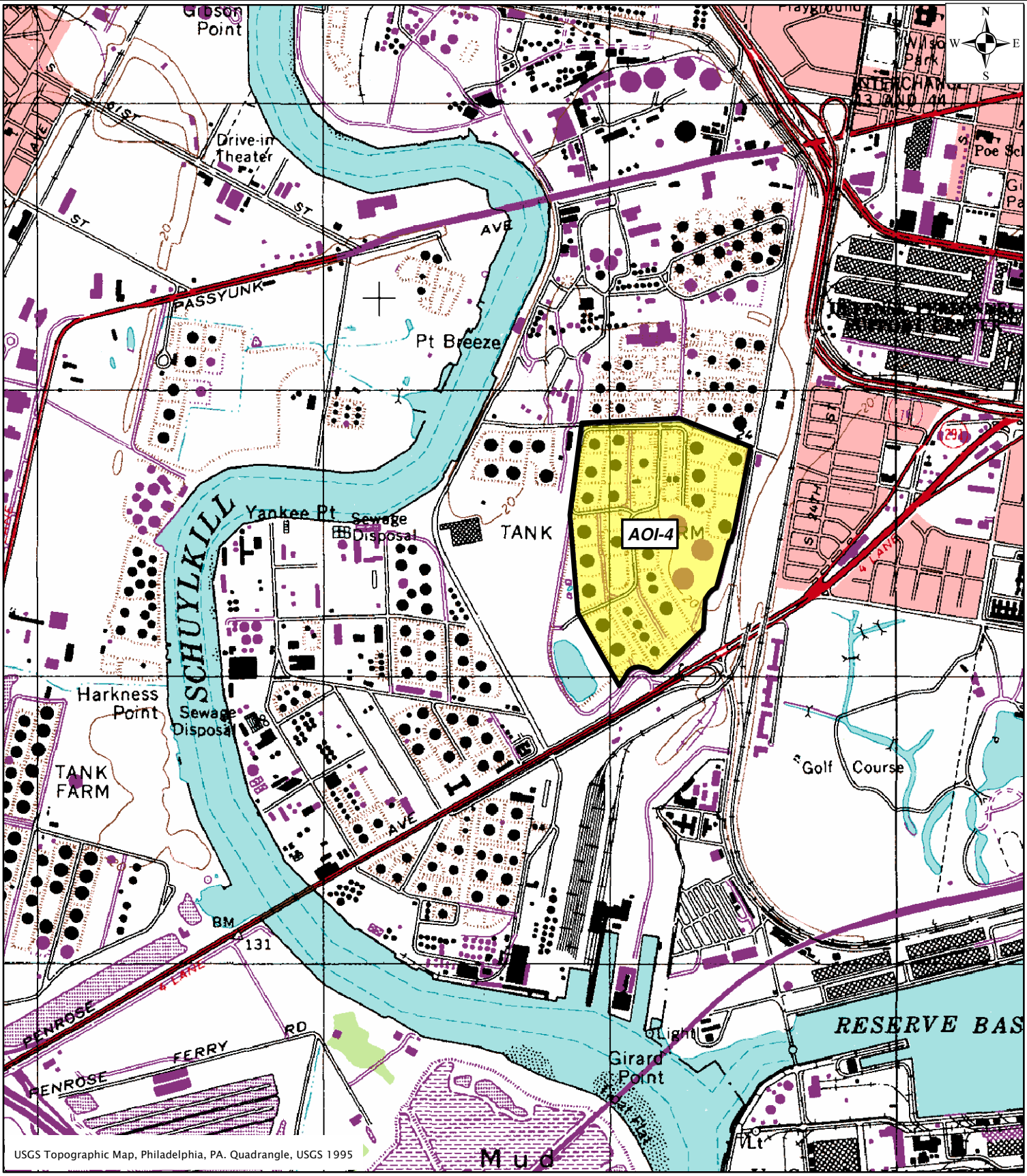
Three steps are needed to convert from decimal to degrees-minutes-seconds: (1) Degrees will be the whole number. (2) To get minutes, multiply the decimal degree portion by 60. (3) Multiply the decimal minute portion by 60 to get seconds.

Example: (Latitude) 40.93748 = **40**° ; 0.93748 x 60 = 56.2488' = **56**' ; 0.2488 x 60 = 14.928 = **15**" = **40°56'15"N**

(Longitude) 75.94740 = **75**° ; 0.94740 x 60 = 56.844' = **56**' ; 0.844 x 60 = 50.64 = **51**' = **75°56'51"W**

FOR PFBC USE ONLY

SIR#	Quad Name	Data Source	Search Results-Potential Species Conflict	Action



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

SUNOCO

PHILADELPHIA ENERGY SOLUTIONS

Sunoco, Inc. (R&M)

PES Facility

3144 Passyunk Avenue
Philadelphia, PA. 19145

Figure 1: Site Location Map
AOI-4
PES Facility

Philadelphia Pennsylvania

Job Number	Scale: 1" = 1,500'	Date
2574601	0 750 1,500 Feet	June 6, 2013

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 1- Site Location Map_6-5-13.mxd



N
W E
S

Legend

AOI Boundary

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

Figure 2: Site Plan
AOI-4
PES Facility
Philadelphia, Pennsylvania

Sunoco, Inc. (R&M)
PES Facility

3144 Passyunk Avenue
Philadelphia, PA. 19145

0 300 600
Feet

SCALE: 1" = 300'
DATE: June 7, 2013
DRN. BY: MH
CKD. BY: DW
JOB#: 2574601

Path: \\langan.com\data\DT\data6\2574601\ArcGIS\MapDocuments\AOI 4 Repackaged SCR\Figure 2 - AOI-4 Site Plan.mxd

1. PROJECT INFORMATION

Project Name: **Sunoco AOI-4**
Date of review: **1/15/2013 9:17:31 PM**
Project Category: **Hazardous Waste Clean-up, Site Remediation, and Reclamation,Other**
Project Area: **107.2** acres
County: **Philadelphia** Township/Municipality: **Philadelphia**
Quadrangle Name: **PHILADELPHIA** ~ ZIP Code: **19145**
Decimal Degrees: **39.907761 N, -75.195107 W**
Degrees Minutes Seconds: **39° 54' 27.9" N, -75° 11' 42.4" W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

PFBC Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)
Scientific Name: Sensitive Species**
Common Name:
Current Status: Threatened
Proposed Status: Special Concern Species*

U.S. Fish and Wildlife Service

RESPONSE: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.

** Sensitive Species - Species identified by the jurisdictinal agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of *Minimum* Materials to be submitted:

____**SIGNED** copy of this Project Environmental Review Receipt
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____Project location information (name of USGS Quadrangle, Township/Municipality, and County)
____USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.
____A basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service
Endangered Species Section
315 South Allen Street, Suite 322, State College, PA. 16801-4851
NO Faxes Please.

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name: Linda Kenney
Company/Business Name: Langan Engineering
Address: PO Box 1569
City, State, Zip: Doylestown PA 18901
Phone:(215) 491-6500 Fax:(215) 491-6501
Email: lkenney@langan.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

1/15/13
date

This tracking update has been requested by:

Company Name:	Langan Engineering
Name:	Cindy McGinley
E-mail:	cmcginley@langan.com
Message:	PES AOI 4 PNDI

Our records indicate that the following shipment has been delivered:

Reference:	2574601
Ship (P/U) date:	Sep 6, 2013
Delivery date:	Sep 9, 2013 11:03 AM
Sign for by:	B.BELL
Delivery location:	BELLEFONTE, PA
Delivered to:	Mailroom
Service type:	FedEx Priority Overnight
Packaging type:	FedEx Envelope
Number of pieces:	1
Weight:	0.50 lb.
Special handling/Services:	Deliver Weekday
Tracking number:	796632046021

Shipper Information	Recipient Information
Cindy McGinley	Ms. Kathy Gipe
Langan Engineering	PA Fish and Boat Commission
2700 Kelly Road	450 Robinson Lane
Suite 200	BELLEFONTE
Warrington	PA
PA	US
US	16823
18976	

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To track the latest status of your shipment, click on the tracking number above, or visit us at fedex.com.

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Pennsylvania Fish & Boat Commission
established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823

September 23, 2013

IN REPLY REFER TO
SIR# 41425

LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
Linda Kenney
2700 Kelly Road
WARRINGTON, Pennsylvania 18976

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 20130115386606
Sunoco AOI-4
PHILADELPHIA County: Philadelphia City

Dear Linda Kenney:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 and refer to the SIR # 41425. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/KDG/dn