REMEDIAL INVESTIGATION REPORT
AREA OF INTEREST 5

Primary Facility Identification Number 748141
PHILADELPHIA ENERGY SOLUTIONS REFINING & MARKETING, LLC
PHILADELPHIA REFINING COMPLEX
PHILADELPHIA, PENNSYLVANIA

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LANGAN

January 16, 2017
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1.0 INTRODUCTION

This Remedial Investigation Report (RIR) has been prepared for Area of Interest (AOI) 5 at the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Refining Complex (Complex). Sunoco Inc. (R&M) (Sunoco) transferred the Complex to PES on September 8, 2012. Sunoco retained the remediation liability prior to this date. The remediation liability was transferred to Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (Evergreen) on December 30, 2013. The remediation program is currently being performed under a Buyer Seller Agreement signed by Sunoco, PES and the Pennsylvania Department of Environmental Protection (PADEP) in September 2012.

Site remediation at the Complex is ongoing as part of previously-established programs and the 2012 Buyer Seller Agreement as described below. The Complex has operated, and is planned to continue operating, as an oil refinery, marketing terminal and petrochemical complex.

Regulatory Overview

Sunoco and the PADEP entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to the Complex. 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 Complex 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 11 AOIs in accordance with the 2003 CO&A. For each AOI that has been characterized, Sunoco prepared and submitted a corresponding Site Characterization Report (SCR) in accordance with the Revised Phase II Corrective Action Activities schedule that was included in the CCR.

In October 2006, Sunoco submitted a notice of intent to remediate (NIR) to the PADEP for the Complex entering the Complex into the Act 2 program. This NIR was later updated and submitted again to the PADEP in November 2014. In November 2011, the Complex was formally entered into the PA One Cleanup Program between the United States Environmental Protection Agency (EPA) – Region III and PADEP. In November 2011, 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.

Sunoco submitted a Site Characterization Work Plan (Work Plan) for AOI 5 on June 15, 2007, to the PADEP and EPA. This Work Plan summarized proposed activities to be completed to characterize AOI 5 in accordance with the objectives of the CCR. The Work Plan was implemented between February and August 2007 and the results were summarized in a SCR submitted to PADEP and EPA on August 24, 2007. The PADEP responded to the submittal of the SCR with a combined AOI comment letter dated April 11, 2011 that included specific comments regarding the AOI 5 SCR.

Sunoco submitted a Site Characterization Report/Remedial Investigation Report/Cleanup Plan (SCR/RIR/CUP) for AOI 5 on December 13, 2011 to the PADEP and EPA. That report summarized additional site characterization work completed between 2007 and 2011, as well as proposed remedial and cleanup activities for AOI 5 based on the characterization. The PADEP responded to the submittal of the SCR/RIR/CUP with a comment letter dated March 15, 2012, stating the issues that need to be addressed in order for Sunoco to obtain a release of liability under Act 2.

On April 23, 2014, PADEP, Evergreen and Langan met to discuss proposed additional AOI 5 characterization activities. The PADEP provided meeting minutes dated April 25, 2014 summarizing the characterization issues that were presented and discussed by Evergreen and Langan.

In accordance with the Work Plan for Sitewide Approach, Evergreen is submitting this RIR for AOI 5 to formerly satisfy the requirements of Act 2. This report describes site characterization work included in the 2007 AOI 5 SCR and 2011 AOI 5 SCR/RIR/CUP, as well as additional site characterization work completed between 2011 and 2016 to supplement the previous work.

The supplemental work was completed to:

- Further characterize quality of surface (0-2 feet interval) and subsurface (2-15 feet interval) soil,
- Address regulated storage tank incidents for certain tanks in AOI 5,
- Delineate horizontal and vertical impacts in soils,
- Further characterize groundwater conditions in areas where constituents of concern (COCs) were previously above their respective screening criteria,

- Delineate light non-aqueous phase liquid (LNAPL),
- Investigate the potential vapor intrusion to indoor air pathway at occupied buildings,
- Further evaluate geology and hydrogeology, and
- Further evaluate contaminant fate and transport qualitatively.

The supplemental characterization work considered PADEP's and EPA's comments to previous work performed, addressed incidents related to Evergreen's operational history not addressed through the PADEP's Tank Program, and PADEP inspection issues that were identified after the 2007 SCR was prepared.

In accordance with Act 2, the required public and municipal notices for this report have been prepared and issued. Appendix A includes a copy of the original Complex NIR, the updated Complex NIR, as well as the report notices and their proof of receipt/publication. Also, included in Appendix A is correspondence from the PADEP with regard to AOI 5.

1.1 AOI 5 Area Description

The Complex is located in southwest Philadelphia. AOI 5 is located in the southern most portion of the Complex and is known as the Girard Point South Tank Field Area (Figure 1 and Figure 2). In 2014, PES built the Butane Rail Facility for loading/loading and storage of butane railcars. AOI 5 is bordered to the north and northwest by Penrose Avenue and the George Platt (formerly Penrose Avenue) Bridge, an industrial facility to the east, and the Schuylkill River to the south and southwest. AOI 5 encompasses approximately 114 acres. A sheet pile bulkhead, which is keyed into the Alluvium clay layer, extends along the entire western boundary of the AOI, between the AOI and the Schuylkill River. The extent of the wall is shown in Figure 2.

The area known as Girard Point Refinery (encompassing AOI 5 through AOI 7) was purchased by Sunoco, Inc. from Chevron USA, Inc. (Chevron) who acquired the facility from the Gulf Oil Company. The facility was purchased by Sunoco in 1994 and transferred to PES in 2012.

1.2 Complex and AOI 5 Operational History

The Complex has a long history of petroleum transportation, storage, and processing. The oldest portion of the Complex started petroleum-related activities in the 1860s when the Atlantic Refining Company established an oil distribution center. In the 1900s, crude oil processing began followed by full-scale gasoline production during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia, were also produced at the Complex for a time.

The primary historic operations at AOI 5 consisted of product storage in numerous above ground storage tanks (ASTs) containing fuel oil, waste oil, and lube oil. AOI 5 also housed packaging facilities. Other historic operations include transfer facilities for rail and trucking and a marine unloading/loading facility. AOI 5 is the oldest operating portion of the Girard Point Refinery, dating back to the 1920s (Dames & Moore, 1987).

Based on the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), dated November 24, 1993, prepared by Dames and Moore, three solid waste management units (SWMUs) are located within AOI 5 and required further characterization. They include SWMU 93 (Storage Tank Areas: Buried Lead Sludge Area 7), SWMU 94 (Storage Tank Areas: Buried Lead Sludge Area 9) and SWMU 101 (Bulkhead Seepage Area).

1.3 AOI 5 Current Use

Currently, AOI 5 consists primarily of light and intermediate product tankage, old warehouses, a benzene rail unloading area, and docks that consist of three barge-loading areas. A loading rack and scale house are currently operating in the southeastern portion of AOI 5, as well as two pump houses. A stormwater separator and hazardous waste storage area are located in the southwestern portion of the AOI 5. Much of the area is open space due to the removal of several large ASTs. Two ship ballast tanks remain in use and, in 2014, PES redeveloped a portion of AOI 5 and constructed a butane rail loading/unloading area with an associated iso-butane storage vessel. A PECO substation is located in the northern most part of AOI 5. A sheet pile bulkhead, keyed into the Alluvium clay layer, extends along the entire southern boundary of AOI 5 along the Schuylkill River. The extent of the sheet pile wall/bulkhead is shown in Figure 2.

Approximately half of AOI 5 is covered by impervious surfaces. The current and historic use figure from the previous AOI 5 SCR was updated to reflect present day conditions/usage as part of the AOI 5 site characterization activities (see figure in Appendix B).

The existing monitoring well network in AOI 5 includes 84 monitoring wells, nine temporary well points, two piezometers, and three inactive recovery wells. Eighteen of the monitoring wells were installed in 2007 as part of the site characterization in AOI 5. Six monitoring wells were installed in 2012 to further investigate LNAPL occurrence and groundwater conditions. Six historical unconfined aquifer monitoring wells that were previously installed in AOI 5 (A-162, A-163, A-164, A-166, A-167, and A-168) were discovered by Aquaterra in 2012 and 2013. An additional seven monitoring wells were installed in 2014 to serve as fate and transport calibration wells and also to evaluate groundwater conditions. In 2014, 11 monitoring wells were abandoned due to the construction of the butane rail loading/unloading facility. Additionally in 2014, eleven historical monitoring wells were discovered and deemed A-174 through A-184. A-174 was subsequently destroyed several months after being discovered. In 2015, three monitoring wells were installed by Stantec Consulting Corporation (Stantec). The wells in AOI 5 are shown in Figure 3.

Groundwater gauging and sampling of select monitoring wells in AOI 5 occurs on an annual basis. This monitoring is completed by Stantec on behalf of Evergreen. Annual gauging activities and groundwater results are reported to the PADEP and EPA in semiannual Groundwater Remediation Status Reports. The reports also include the results of Evergreen's annual perimeter monitoring well sampling program.

1.4 Selection of Constituents of Concern and Screening Rationale

The COCs for soil and groundwater in AOI 5 are listed in Table 1 of this report. The COCs for the completed activities include all current constituents from the Pennsylvania Corrective Action Program 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 match the soil COC list. 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.

The screening of the COCs was dependent upon the media of concern where all soil and groundwater screening levels were obtained from the PADEP Non-Residential medium specific concentrations (MSCs) for soils and groundwater last updated on August 27, 2016. These screening levels apply to all COCs except for surface soil lead values where a Complex-established site-specific standard (SSS) for lead has been approved by the PADEP.

Media of Concern

The media of concern for AOI 5 include soil and groundwater. The potential vapor intrusion into indoor air exposure pathway was evaluated by completing a site-specific indoor air evaluation. Surface water was evaluated as a receptor in relation to facility activities.

Surface Soil – 0 to 2 Feet Interval

Surface or 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 Complex workers. These surface soil results were screened against the PADEP non-residential soil direct contact MSCs and the Complex-established SSS for lead. The SSS for lead was submitted in the Human Health Risk Assessment (HHRA) by Langan in 2015 and was approved by the PADEP on May 6, 2015.

Subsurface Soil – 2 to 15 Feet Interval

Subsurface or deep (2-15 feet) soil samples were collected at several locations to either vertically characterize surface soil exceedances or to characterize subsurface soils where only a surface sample was previously collected. These subsurface soil results were screened against the PADEP non-residential soil direct contact MSCs.

Groundwater

Groundwater sample results were screened against the PADEP non-residential, used-aquifer (total dissolved solids (TDS<2,500) Statewide Health Standards (SHS) groundwater MSCs. This report includes a qualitative fate-and-transport analysis for groundwater. Evergreen is preparing a separate, quantitative site-wide fate-and-transport analysis for the Complex.

Surface Water

The Schuylkill River borders AOI 5 to the west and south. A sheet pile wall exists along the border with the river. Evergreen will be examining site-wide surface water compliance in future reporting.

Vapor Intrusion into Indoor Air

To evaluate the potential vapor intrusion into indoor air exposure pathway, indoor air sample results were screened against the current (January 2017) and one-tenth of the current PADEP Non-Residential Indoor Air SHS Vapor Intrusion Screening Values. The results were also compared to the OSHA Permissible Exposure Limits (PELs), the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). The EPA Industrial Regional Screening Levels (RSLs) were included in the comparison to identify COCs. Initially, the results were compared to the EPA Industrial RSLs established at a target cancer risk of 1E-05 and hazard quotient of 0.1. If vapor intrusion is the only potentially complete exposure pathway, these RSL-based screening levels are the prevailing risk-based screening levels for assessment of the indoor air inhalation pathway (PADEP 2015). The results were also conservatively compared to the EPA industrial RSLs established at a target cancer risk of 1E-06 and hazard quotient of 0.1.

1.5 Overview of Investigative Framework and Remedial Approach for AOI 5

The current remediation program for the Complex is described in the 2003 CO&A between PADEP and Sunoco, and the Work Plan for Sitewide Approach. Below is a general summary of the regulatory framework for the Complex:

- In April 2004, the PADEP and EPA signed an agreement entitled "One Cleanup Program Memorandum of Agreement (MOA or One-Cleanup Program)," which clarifies how sites remediated under Pennsylvania's Act 2 program may satisfy RCRA corrective action requirements through characterization and attainment of Act 2 remediation standards pursuant to Pennsylvania's Act 2.
- In 2005, PADEP, EPA, and Sunoco agreed that the One Cleanup Program would benefit the project by merging the remediation obligations under the various programs into one streamlined approach which would be conducted under the existing 2003 CO&A.
- In October 2006, Sunoco submitted a NIR to the PADEP for entering the

Complex into the Act 2 program, excluding the Belmont Terminal.

- In June 2007, Sunoco submitted a Work Plan for Site Characterization Activities for AOI 5 in accordance with the Phase II Corrective Action Schedule.
- On August 24, 2007, Sunoco submitted the AOI 5 SCR to the PADEP for review.
- In September 2007, Sunoco held a public involvement meeting in South Philadelphia, Pennsylvania.
- On April 11, 2011, PADEP provided their comments to the AOI 5 SCR. Comments were focused around the lack of an addendum submittal as suggested in the SCR. The PADEP suggested that a SCR/RIR be submitted that addressed the recommendations stated in the SCR. These recommendations included further delineation of leaded tank bottom materials, additional soil boring installations, resampling of monitoring well A-138 for cumene, and the evaluation of enhancements to the 9 Berth Recovery System.
- On November 8, 2011, the EPA provided an acknowledgment letter to Sunoco formerly accepting the Sunoco Complex into the One Cleanup Program.
- On November 30, 2011, 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. PADEP and EPA reviewed and provided input to this report. Sunoco submitted a letter of commitment stating the Complex will be remediated according to the Work Plan for Sitewide Approach.
- On December 13, 2011, Sunoco submitted a SCR/RIR/CUP to the PADEP for review.
- On March 15, 2012, PADEP provided their comments on the additional work required for AOI 5 based on deficiencies noted in the SCR/RIR/CUP submitted on December 13, 2011. PADEP concerns and proposed actions included the following issues:
    - LNAPL in wells located adjacent to the Schuylkill River potentially affecting the river.
    - LNAPL in wells A-155 and A-14 not being suitably delineated.
    - A lack of delineation of impacts in subsurface soils for benzene and lead.
    - Additional investigation of the 2-15 foot soil interval.
    - Further evaluation of the vapor intrusion pathway.
    - Additional soil investigation and delineation of SWMU-93, SWMU-94, and SWMU-101.
- On April 23, 2014, a meeting between PADEP, Evergreen and Langan personnel

was held to discuss Evergreen's Work Plans for AOI 5. Discussions included soil boring and well installations, groundwater sampling, indoor air evaluation, soil delineation sampling, LNAPL delineation, fate and transport modeling, SWMU soil sampling, and open storage tank incidents requiring action. David Brown of PADEP provided a summary of notes from the meeting and email summary on April 25, 2014; these items are included in Appendix A.

- In November 2014, Evergreen submitted an updated NIR to the PADEP for the Complex, excluding the Belmont Terminal which is not owned by PES.
- On February 24, 2015, Langan, on behalf of Evergreen, submitted an HHRA report for a SSS of lead in soil for the PES Refining Complex, the Sunoco Partners Marketing & Terminals, LP Belmont Terminal (Belmont Terminal) and the Sunoco Partners Marketing & Terminals, LP Marcus Hook Industrial Complex (MHIC) (Langan 2015). This HHRA was approved by the PADEP in a letter dated May 6, 2015.

2.0 SITE DESCRIPTION

2.1 Geology

The Complex occurs within the up-dip limits of the Atlantic Coastal Plain, generally within two miles of the "Fall Line," where crystalline bedrock of the Appalachian foothills intersects the ground surface (outcrops). The Atlantic Coastal Plain is a physiographic province that is defined as having relatively flat topography and as being underlain by a characteristic wedge of unconsolidated sediments that thicken in a southeasterly direction, away from sediment source areas in the Appalachian Mountains. These sediments were deposited atop a sloping bedrock surface in complex fluvial, estuarine, and marginal marine environments along the passive Atlantic margin. Overall, subsidence of the Piedmont land surface in conjunction with cyclical sea-level fluctuations have been the primary controlling mechanisms driving periods of deposition, non-deposition and erosion in the Atlantic Coastal Plain (Trapp and Meisler, 1992). In general, the resulting sedimentary record in the vicinity of the Complex is complex, largely incomplete, and under-represented by only Cretaceous and Quaternary deposits, separated by a regional disconformity. A summary of those deposits within AOI 5 is presented below.

Since 2007, 27 unconfined aquifer monitoring wells ranging between 5 to 18 feet below ground surface (bgs) and 291 soil borings were completed to further characterize geology in

AOI 5. Also, 36 composite and 36 grab soil samples were obtained by Stantec as part of the PES butane rail loading/unloading installation. Each monitoring well and soil boring location was continually logged by a field geologist. Monitoring well construction details for the AOI 5 monitoring wells are provided in Table 2 and boring/monitoring well construction logs for the existing monitoring wells are provided in Appendix C of this report.

Subsurface lithology from the numerous borings and monitoring wells completed in AOI 5 was used to characterize AOI 5 geologic conditions beneath AOI 5. A 3-dimensional (3D) geologic model of AOI 5 was generated with C Tech Development Corporation's Earth Volumetric Studio (EVS) software using historic and recently completed borings and monitoring well logs. One cross-section trending north to south and one trending east to west were created from the 3D geologic model. The plan view key for the cross sections is provided as Figure 4, and the geologic cross sections are provided as Figures 5a and 5b. The depiction of the Holocene Alluvium, as shown in Figures 5a and 5b, differs from that depicted in the 2007 SCR because of refinement of the geologic model based upon supplemental subsurface data obtained since 2007.

The following paragraphs describe the primary geologic units beneath AOI 5 beginning with the deepest units to the shallowest units.

BEDROCK

Wissahickon Formation – Bedrock beneath the Complex and AOI 5 is identified as the Wissahickon Schist. This formation is a metamorphosed greenish-gray micaceous schist and quartzite. The competent bedrock of the Wissahickon Formation is overlain by weathered bedrock consisting of micaceous clay, which becomes increasingly sandy as the degree of weathering lessens and competent bedrock is encountered. The weathered zone of the Wissahickon Schist was encountered approximately 87 feet bgs at monitoring well A-21D on the western side of AOI 5, as shown in the geologic cross-sections presented as Figures 5a and 5b. Two additional Lower Sand monitoring wells (A-13D and A-19D) did not encounter bedrock at their respective total depths of 69 feet and 60 feet bgs. However, based on geologic interpretation from USGS publications, weathered bedrock in the central and northern portions of AOI 5 is at approximately 90 feet bgs.

CRETACEOUS DEPOSITS

The Cretaceous deposits are configured in a southeasterly-thickening wedge, overlain by the much younger Quaternary deposits, and underlain by the Wissahickon Formation. The

wedge is made up of a series of vertically alternating aquifers and confining units called the Potomac-Raritan-Magothy (PRM) aquifer system. Each of the geological units of the PRM progressively pinches-out to the northwest. The PRM aquifer system consists of six units:

- Upper Clay unit;
- Upper Sand unit;
- Middle Clay unit;
- Middle Sand unit;
- Lower Clay unit, and
- Lower Sand unit.

Lower Sand Unit of the PRM – Throughout the majority of the Complex, the Wissahickon Formation is overlain by the Lower Sand, which is the lowest member of the PRM aquifer system. As shown in Figures 5a and 5b, the Lower Sand overlies bedrock in AOI 5.

Boring logs for the three lower aquifer monitoring wells A-13D, A-19D, and A21D indicate the Lower Sand beneath AOI 5 is fine gravel and course sand that grades upward into medium-to-fine sands and may contain layers of silts and clay. The Lower Sand is located approximately 51 to 75 feet bgs. Based on available stratigraphic data, the Lower Sand is approximately 12 feet thick in the southwestern portion of AOI 5 and increases in thickness towards the eastern-northeastern portion of AOI 5 to approximately 40 feet. The interpreted extent of the Lower Sand beneath AOI 5 is consistent with the extent illustrated by USGS (USGS, 1961) and also with the generalized cross section prepared in 1992 by Dames and More presented in the CCR.

Lower/Middle Clay – The Lower Sand is overlain by the Lower/Middle Clay unit in AOI 5. The Lower/Middle Clay, is characterized by very low permeability reddish-brown, brown or gray clays, sandy clays, with trace amounts of organic matter.

As shown in Figures 5a and 5b, the Lower/Middle Clay ranges in thickness from 0 feet 23 feet throughout AOI 5. The Lower/Middle Clay appears to be fairly extensive throughout the western half of AOI 5 due to the significant thicknesses of 10 and 25 feet observed in A-19D and A-21D well logs, respectively. Based on the absence of the Lower/Middle Clay in the A-13D well log, the clay layer is believed to pinch out to the southeast in the direction of the confluence of the Schuylkill and Delaware Rivers. Where present the Lower/Middle Clay functions as a confining bed to the Lower Sand aquifer.

QUATERNARY DEPOSITS

Trenton Gravel – Throughout most of the Complex, the Trenton Gravel typically overlies the Lower/Middle Clay and Lower Sand with thicknesses up to 30 feet. The Trenton Gravel is of Pleistocene Age (Ice Age; less than 2 million years) and is a heterogeneous unit comprised of a predominant brown to gray sand, gravel and minor amounts of clay (Owens and Minard, 1979). Along the Schuylkill River, most of the Pleistocene formations have been eroded away (Greenman et al., 1961). Based on available soil boring logs the Trenton Gravel is not present beneath AOI 5.

Recent (Holocene) Alluvium – Recent deposits of richly organic, dark gray mud, silt, and fine sand underlie the channels and tidal flats of the Delaware and Schuylkill Rivers. These sediments are most abundant in south Philadelphia near the confluence of the Delaware and Schuylkill Rivers, and can be up to 78 feet thick (Greenam et al., 1961). The alluvium ranges in thickness from approximately 20 feet (A-19D) in the northern portion of AOI 5 to up to 47 feet (A-13D abandoned in March of 2014) near the Schuylkill River. Based on the available stratigraphic data, the alluvium deposits in AOI 5 generally consist of two distinct stratigraphic layers;

- Silt layer: a soft, medium brown to dark gray silt, with organics and pieces of wood, trace to some clay, and interbedded thin sand and gravel lenses; overlain by
- Clay layer: a soft, dark gray clay, with trace to some silt, trace fine sand, and trace organics.

The silt and clay layers range in thickness from approximately 20 to 36 feet and 0 to 12 feet, respectively, across AOI 5. The alluvium sediments are less permeable than the Lower Sand unit and function as a leaky confining bed to the lower aquifer. Hydraulic conductivity estimates from aquifer tests of monitoring wells within AOI 5 which are screened across the Anthropogenic Fill and Holocene clay layer (A-22, A-24, A-140, A-147, A-151, and A-154) ranged from 0.35 to 56 feet per day (ft/day) (Dames & Moore, 1987, Langan, 2007). It is reasonable to assume the higher estimates are more representative of the fill material, and the lower range is a more appropriate value for the Holocene clay layer. Estimates from all aquifer tests in the unconfined aquifer in AOI 5 are significantly less than the published hydraulic conductivity estimates from the Lower Sand, which range between 123 to 153 ft/day (Paulachok, 1991).

The thick, low permeability, Holocene Alluvium deposits within AOI 5 tends to limit the free

interchange of water between the Schuylkill River and the unconfined aquifer. The Holocene silt layer appears to thicken to the southeast in the direction of the confluence of the Schuylkill and Delaware Rivers. The Holocene clay layer is believed to be fairly extensive across AOI 5 and eventually pinches out to the north (absent in A-19D well log), and may thin in the vicinity of historic tributaries to the Schuylkill River. The southern and western boundary of AOI 5 is bound by a sheet pile wall which is keyed into the Holocene clay layer as shown in Figures 5a and 5b.

Anthropogenic Fill

The Anthropogenic Fill varies in composition across AOI 5 and includes sands and gravels, brick, wood fragments and cinder ash up to 21 feet thick. Fill thickness tends to increase to the north as shown in Figures 5a and 5b.

2.2 Hydrogeology

The hydrogeologic frame work is defined by grouping geologic units that are laterally extensive and have similar hydrogeologic properties. The generalized hydrostratigraphy of the Complex consists of seven layers (Schreffler, 2001, Sloto 2012). Site-wide hydrostratigrapghy consist of:

- Layer 1: combined Anthropogenic Fill, Holocene Alluvium and Trenton Gravel (Trenton Gravel does not appear to be present in AOI 5)
- Layer 2: Upper Clay unit of the PRM (not present in AOI 5)
- Layer 3: Upper Sand unit of the PRM (not present in AOI5)
- Layer 4: Middle Clay unit of the PRM
- Layer 5: Middle Sand unit of the PRM (not present in AOI5)
- Layer 6: Lower Clay unit of the PRM, and
- Layer 7: Lower Sand unit of the PRM.

Within AOI 5, the hydrogeologic framework consists of the combined Anthropogenic Fill and Holocene Alluvium (which is referred to as the unconfined aquifer and makes up the water table aquifer). At depth and where less permeable, the Holocene Alluvium also acts as a leaky confining unit. Beneath the Holocene Alluvium is the Lower/Middle Clay confining unit (referred to as the clay aquitard). Beneath the clay aquitard is the Lower Sand which is a semi-confined to confined aquifer. The Lower Sand lies above the Wissahickon Schist bedrock.

2.2.1 Porosity

In July 2014, two Shelby Tube soil samples in the unconfined aquifer soils of AOI 5 were collected to determine soil properties (Appendix C). Soil sample A-170 8.5'-10.5' and A-186 8.5'-10.5' were both collected from a depth of 8.5 to 10.5 feet bgs. The soil sample from A-170, described as dark gray elastic silt with sand, trace roots, and organics, had a total porosity of 0.541 and an effective porosity of 0.182. The soil sample from A-186, described as dark gray elastic silt, with some organics, had a total porosity of 0.609 and an effective porosity of 0.205. The average total and effective porosities of the two samples are 0.575 and 0.194, respectively. In the calibrated groundwater flow model created by the USGS (Schreffler, 2001), a porosity of 0.3 was used for the unconfined aquifer.

2.2.2 Unconfined Aquifer Groundwater Occurrence and Flow

As defined above, the unconfined aquifer is the combined fill/alluvium which make up the water table aquifer. Groundwater gauging data collected by Aquaterra Technologies, Inc. (Aquaterra) in July and October of 2014 were used to generate groundwater flow figures for the unconfined aquifer (Figure 6 and Figure 7). The groundwater elevation data from these gauging events is provided in Table 3a and 3b and Appendix C. Monitoring well construction details for these monitoring wells are provided in Table 2 and all available logs for wells installed in AOI 5 are provided Appendix C of this report. Based on the groundwater elevations as shown in Figure 6 and Figure 7, the following observations can be made:

- Groundwater elevations recorded in AOI 5 during the July and October 2014 gauging events indicate unconfined groundwater flow is generally to the south towards the Schuylkill River under a typical hydraulic gradient of 0.005 feet/feet (ft/ft).
- Unconfined groundwater flow appears to be influenced by in-filled historic tributaries of the Schuylkill River as indicated by the valley-like gradient patterns in the vicinity of these features due to the contrast in hydraulic conductivity between natural and fill materials.

- Unconfined groundwater flow in AOI 5 is also influenced by the presence of the sheet pile bulkhead which extends along the AOI's boundary with the Schuylkill River and is keyed into the Holocene clay. Limited groundwater mounding behind portions of the sheet pile wall was observed in AOI 5 during both the July and October 2014 gauging events.
- Observations made from the 2014 data are consistent with flow observations made from previous gauging events.

2.2.3 Lower Aquifer Groundwater Occurrence and Flow

As defined above, within AOI 5 the lower aquifer is the Lower Sand unit of the PRM and is a semi-confined to confined aquifer. This lower aquifer is separated from the unconfined aquifer by subsequent confining, leaky confining, and confining units of the Holocene clay layer, Holocene silt layer, and the Lower/Middle Clay unit. Head potentials observed during the May 2011 gauging event in unconfined and lower aquifer monitoring well pairs confirm the two aquifers are hydraulically separated. The head differences measured in May 2011 between A-13 and A-13D, and A-21 and A-21D, were 4.59 and 11.3 feet, respectively. The observed head differences correspond to downward vertical hydraulic gradients of 0.082 and 0.16 ft/ft at the A-13 and A-21 monitoring well pairs, respectively.

As referenced above, published hydraulic conductivity estimates for the Lower Sand range between 123 to 152 ft/day with a mean of 135 feet/day (Paulachok, 1991). Based on limited lower aquifer monitoring wells within AOI 5, groundwater in the lower aquifer is assumed to flow southwest towards the Schuylkill River, under hydraulic gradient of 0.004 ft/ft. This assessment of lower aquifer groundwater conditions generally corresponds with the groundwater flow direction and gradients collected during the March 2013 site-wide gauging of the lower aquifer.

2.3 Surface Water

No surface water features are located in AOI 5. The nearest surface water body to AOI 5 is the Schuylkill River which comprises the southern boundary of AOI 5. A sheet pile wall that is keyed into the Alluvium clay layer exists between AOI 5 and the Schuylkill River as shown in Figure 2 and Figures 5a and 5b. Unconfined groundwater interaction with the Schuylkill River tends to be limited by the sheet pile wall. Evergreen will be examining site-wide surface water compliance in future reporting.

3.0 SITE CHARACTERIZATION ACTIVITIES

Initial site characterization activities in AOI 5 were performed between February and August 2007 and the results were summarized in the 2007 SCR. Additional site characterization activities were completed in April and July 2009 and the results were summarized in the 2011 SCR/RIR/CUP. Based on the findings of the SCR and the SCR/RIR/CUP, additional site characterization activities were completed between March 2013 and February 2016. Site characterization activities were completed by Aquaterra and Langan in coordination with Evergreen. These activities were executed in accordance with the Evergreen Quality Assurance/Quality Control (QA/QC) Plan and Field Procedures Manual provided in Appendix D. The following sections summarize the supplemental site characterization activities completed in AOI 5 since the submittal of the 2011 SCR/RIR/CUP.

3.1 Surface Soil Borings and Sampling

In 2007, five surface soil samples were collected for analysis of site COCs from areas within AOI 5. All five soil samples were collected during the advancement of monitoring wells.

After the submission of the SCR in October 2007, additional surface soil characterization work was performed in AOI 5 in 2009. A total of 17 soil samples were collected for analysis of site COCs from areas within AOI 5. Six of the soil samples were collected during the advancement of monitoring wells within AOI 5 and the remaining 11 soil samples were collected to delineate benzene and lead exceedances above the PADEP non-residential soil MSC.

Additional work was performed in AOI 5 after the submission of the SCR/RIR/CUP in December 2011. Four surface soil samples were collected during the advancement of six monitoring wells within AOI 5 in November 2012. Twelve soil samples were collected to delineate lead exceedances above the PADEP non-residential soil MSC in March 2013. Three additional samples were collected in October 2013 to delineate a former lead exceedance from March 2013.

Additional delineation activities were performed in March 2014, when four surface soil samples were collected to further delineate benzene, benzo(a)pyrene, cumene and lead detections above the PADEP non-residential soil direct contact MSCs and the SSS for lead within the eastern tank farm area of AOI 5.

In June of 2014, a total of seven surface soil samples were collected during the advancement of seven monitoring wells within AOI 5. Six of these monitoring wells were installed to serve as fate and transport calibration wells and the 7th well was installed as part of supplemental tank investigations discussed in Section 3.5.

Additional surface soil sampling occurred in June 2014 and February 2016, however, these soil borings were installed as part of supplemental tank investigations and are discussed in Section 3.5.

The locations of all soil borings are shown on Figure 3 and the boring logs are provided in Appendix C. All soil samples were collected using stainless steel hand augers. Soil borings were advanced to a maximum depth of two feet bgs at each location in accordance with the Work Plan documents. Due to shallow water table conditions in some areas of AOI 5 (less than 2 feet bgs), some surface samples were unable to be collected during the 2015 soil investigation; however, these areas were delineated with other surface soil samples.

Surface soil samples from 2007 were submitted to Pace Analytical (Pace) of Export, Pennsylvania for analysis of site COCs. The 2009 surface soil samples were analyzed by Lancaster Laboratories, Inc. (LLI) of Lancaster, Pennsylvania. In 2012, samples were submitted to LLI and Accutest Laboratories of Dayton, New Jersey (Accutest). The 2013 and 2014 soil samples were submitted to Accutest. All labs are Pennsylvania-certified labs. The soil samples collected in 2015 were submitted to Pace of Pittsburgh, Pennsylvania, for analysis of site COCs. A summary of the soil analytical results screened against the PADEP non-residential soil direct contact MSCs and the SSS for lead is provided as Table 4 and the

results are discussed in Section 5.0. A summary of the PADEP non-residential soil direct contact MSC and SSS for lead exceedances are illustrated in Figure 8. The laboratory analytical reports are provided as Appendix E.

3.2 Subsurface Soil Borings and Sampling

Between August 2012 and March 2013, a total of 15 subsurface soil samples were collected to characterize subsurface soil and to vertically delineate previously identified benzene and lead exceedances in surface soil above the PADEP non-residential soil MSC. Seven subsurface samples were collected during the advancement of monitoring wells in June 2014.

Additional subsurface soil sampling occurred in June of 2014; however, these soil borings were installed as part of supplemental tank investigations and are discussed in Section 3.5.

The locations of all soil borings are shown on Figure 3 and the boring logs are provided in Appendix C. All soil samples were collected utilizing a stainless steel hand auger. Soil borings were advanced to between 2 feet below grade and the soil water interface in accordance with the Evergreen QA/QC Plan and Field Procedures Manual.

In 2012, samples were submitted to Accutest. The 2013 and 2014 soil samples were submitted to Accutest. A summary of the soil analytical results screened against the PADEP non-residential soil direct contact MSCs is provided as Table 5 and the results are discussed in Section 5.2. A summary of the PADEP non-residential soil direct contact MSC exceedances are illustrated in Figure 9. The laboratory analytical reports are provided as Appendix E.

3.3 Soil Borings at RCRA SWMU Areas

The 1993 RCRA RFI identified three SWMUs in AOI 5 that required further characterization. These SWMUs include SWMU 93 (Storage Tank Areas: Buried Lead Sludge Area 7), SWMU 94 (Storage Tank Areas: Buried Lead Sludge Area 8), and SWMU 101 (Bulkhead Seepage Area).

SWMUs 93 and 94 were investigated to characterize soil quality and to investigate for the presence of leaded tank bottom materials following the investigative approach outlined in

Section 1.2.2, 1.23 and 1.24 of the AOI 5 Work Plan. SWMU 101 was investigated for the presence of lead exceedances in soil and to characterize soil quality. The approach for identifying leaded tank bottom materials at that time is summarized below:

- If materials were encountered within the leaded tank bottom areas, matching the physical description of the leaded tank bottoms, then samples were collected for lead.
- If the lead results were above 450 parts per million (ppm) (PADEP's non-residential soil MSC for lead) then samples were analyzed for lead via Toxicity Characteristic Leaching Procedure (TCLP), EPA Test Method 1311.
- Delineated areas that have soils that physically resemble leaded tank bottoms, have concentrations of total lead exceeding 450 ppm, and are hazardous for lead based on TCLP analysis, will retain the leaded tank bottom designation. If soils did not meet all three of the above-mentioned criteria, then the area would no longer be classified as a leaded tank bottom area.

Soil borings were advanced at these specified SWMU areas and samples were collected to assist with the general site characterization activities described in this RIR and will ultimately allow for EPA preparation of Statement of Basis (SB) documentation for the SWMUs within AOI 5 and the completion of RCRA Corrective Action obligations by Evergreen. A SWMU closure request letter will be sent to the EPA under separate cover. These soil boring activities occurred between 2007 and 2014.

Designated boring locations within these SWMUs are displayed on Figure 3 and the boring logs are provided in Appendix C. Utilizing a stainless steel hand auger, soil borings were advanced to a minimum depth between 2 feet bgs and the soil water interface at each location in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. With regard to analysis, the soil samples collected in 2007 were submitted to Pace, the soil samples collected in 2009 were submitted to LLI, and the soil samples collected in 2012, 2013, and 2014 were submitted to Accutest. A summary of the surface and subsurface soil analytical results are provided in Table 4 and Table 5, respectively, and the results are discussed in Section 5.0. The laboratory analytical reports are provided as Appendix E. The site characterization activities for each SWMU are summarized below by SWMU.

3.3.1 Surface Soil Borings in SWMU 93

In November 2005, Sunoco installed a cover over the northern two-thirds of SWMU 93 which currently serves as a parking area. From bottom to top, this cover consists of approximately 18 inches of No. 4 stone placed atop the former grade, a layer of woven geo-textile fabric, and 6 to 10 inches of crushed concrete. This cover acts as a barrier which eliminates the potential direct contact exposure pathway to soil beneath the cover. Therefore, no soil borings or samples were collected beneath this cover as part of the 2007 and 2009 site characterization activities. However, soil samples were collected in this area as described in this sub-section, during the PES Butane Rail Line Development (see Section 3.4), as part of tank investigations (see Section 3.5) and well installation (see Section 3.6). The southern one-third of SWMU 93 is not covered by impervious surface and the investigation activities for this area are discussed below.

In 2007, 10 surface soil borings were advanced and five soil samples (BH-04-07, BH-05-07, BH-06-07, BH-07-07, and BH-08-07) were collected in SWMU 93 to investigate for leaded tank bottom materials. Five of the soil borings did not result in the collection of soil samples due to the shallow depth to the water table.

In 2009, the following sampling was completed to further delineate lead exceedances in soil and leaded tank bottom materials:

- Four surface soil borings (BH-05-09, BH-06-09, BH-07-09, and BH-08-09) were advanced and four soil samples were collected for lead analysis around soil boring location BH-07-07 completed in 2007.
- Four surface soil borings (BH-17-09, BH-18-09, BH-19-09, and BH-20-09) were advanced and four soil samples were collected for lead analysis around soil boring location BH-08-07 completed in 2007.
- One additional surface soil boring was advanced for site COCs (BH-25-09).

In March 2013, three additional soil borings were advanced for horizontal delineation of a lead exceedance at BH-25-09 and two soil samples were collected (BH-13-18 and BH-13-19). One soil boring (BH-13-20) did not result in the collection of a soil sample due to the shallow depth to the water table.

In June of 2014, some surface soil sampling occurred that was within the SWMU 93 area, however, these soil borings/monitoring wells were installed as part of supplemental tank investigations and are discussed in Section 3.5. No leaded tank bottom materials were observed during the June 2014 soil sampling event. Soil samples were analyzed for the entire site COC list.

3.3.2 Surface Soil Borings in SWMU 94

In 2007, 15 surface soil borings were advanced and six soil samples (BH-13-07, BH-18-07, BH-20-07, BH-21-07, BH-23-07, and BH-24-07) were collected in SWMU 94 to investigate for leaded tank bottom materials. Nine of the soil borings did not result in the collection of soil samples due to the shallow depth to the water table.

In 2009, the following site characterization activities were completed to further delineate lead exceedances of the MSC and leaded tank bottom materials:

- Four soil borings (BH-01-09, BH-02-09, BH-03-09, and BH-04-09) were advanced and four surface soil samples were collected for lead analysis around soil boring location BH-18-07 completed in 2007.
- Four soil borings (BH-21-09, BH-22-09, BH-23-09, and BH-24-09) were advanced and four surface soil samples were collected for lead analysis around soil boring location BH-23-07 completed in 2007.
- Two soil borings (BH-33-09 and BH-34-09) were advanced and two surface soil samples were collected for lead analysis south of soil boring location BH-02-09 completed in 2009.
- Two soil borings (BH-35-09 and BH-36-09) were advanced and two surface soil samples were collected for lead analysis north of soil boring location BH-04-09 completed in 2009.
- Two surface soil borings (BH-37-09 and BH-38-09) were advanced and two soil samples were collected for lead analysis south of soil boring location BH-22-09 completed in 2009.

Additional site characterization activities were completed to further delineate lead exceedances and possible leaded tank bottom material in SWMU 94 as follows:

- In August 2012, ten soil borings were advanced and eight surface soil samples were collected (BH-17-12, BH-19-12, BH-21-12, BH-23-12, BH-25-12, BH-28-12, BH-32-12, and BH-33-12). Two soil borings (BH-18-12 and BH-24-12) were attempted but had no soil samples collected due to shallow water table conditions.
- In March 2013, in response to PADEP comments, nine soil borings were attempted and of these nine soil borings, two were unsuccessful (BH-13-07 and BH-13-10) due to shallow water table conditions. Surface soil samples were collected from the other seven borings (BH-13-02, BH-13-03, BH-13-05, BH-13-06, BH-13-08, BH-13-11, and BH-13-13).
- In October 2013, in response to PADEP comments, eight soil borings were advanced. Eight shallow soil samples were collected (BH-13-116, BH-13-117, BH-13-121, BH-13-122, BH-13-123, BH-13-124, BH-13-125, and BH-13-126).
- In March 2014, five soil borings were advanced and five surface soil samples were collected (BH-14-01, BH-14-02, BH-14-06, BH-14-7, and BH-14-08).
- In June of 2014, additional surface soil sampling occurred that was within the SWMU 94 area, however, these soil borings/monitoring wells were installed as part of supplemental tank investigations and are discussed in Section 3.5. No leaded tank bottom materials were observed during this soil sampling event. Soil samples were analyzed for the entire site COC list.

3.3.3 Surface Soil Borings in SWMU 101

In 2007, four soil borings (BH-25-07, BH-26-07, BH-27-07 and A-142) were advanced and four surface soil samples were collected for total lead in SWMU 101.

In 2009, four additional soil borings were advanced and four surface soil samples were collected (BH-09-09, BH-10-09, BH-11-09, and BH-12-09) for total lead analysis around BH-27-07 due to lead detections above the PADEP soil MSC in the 2007 sampling event. Also in 2009, two additional soil borings (BH-39-09 and BH-40-09) were advanced and two surface soil samples were collected for lead analysis north of soil boring location BH-09-09 completed in 2009.

In August 2012, three surface soil samples were collected from three soil

borings (BH-34-12, BH-36-12 and BH-40-12) to further investigate lead exceedances within SWMU 101.

In March 2013, a total of four surface soil samples (BH-13-38, BH-13-39, BH-13-42, and BH-13-43) were collected from five soil borings to delineate lead exceedances from prior sampling events. One soil sample (BH-13-41) was proposed but was not successfully sampled due to access issues.

In October 2013, a total of nine surface soil samples were collected from nine soil borings (BH-13-150 through BH-13-156, BH-13-158 and BH-13-159). These soil borings were advanced to delineate lead exceedances in previous soil boring locations BH-13-12, BH-13-38, and BH-13-39 completed in 2013. One soil sample (BH-13-157) was proposed but was not successfully sampled due to access issues.

In June of 2014, four soil borings/monitoring wells (A-171, A-172, A-185, and BH-14-38) were advanced for surface soil sampling purposes within SWMU 101. A total of four surface soil samples were collected from the four soil borings/monitoring wells (A-171, A-172, A-185, and BH-14-38). Soil boring BH-14-38 was originally proposed to be a monitoring well but a subsurface obstruction prevented the well installation. These soil borings/monitoring wells were advanced for future quantitative fate and transport modeling purposes.

3.3.4 Subsurface Soil Borings in SWMU 93

In August 2012, three soil borings were attempted to vertically delineate impacts in SWMU 93 from leaded tank bottoms. All three borings (BH-08-12, BH-09-12, and BH-11-12) were unsuccessful due to shallow water table conditions within AOI 5.

In March 2013, three additional soil borings were attempted to vertically delineate impacts in SWMU 93 from leaded tank bottoms. All three borings (BH-13-19, BH-13-20, and BH-13-21) were unsuccessful due to shallow standing water in the area.

Also in March and June of 2014, additional subsurface soil sampling occurred

that was within the SWMU 93 area, however, these soil borings/monitoring wells were installed as part of supplemental tank investigations and are discussed in Section 3.5. No leaded tank bottom materials were observed during the June 2014 soil sampling. Soil samples were analyzed for the entire site COC list.

3.3.5 Subsurface Soil Borings in SWMU 94

In August 2012, vertical delineation activities occurred to delineate impacts in SWMU 94 for leaded tank bottom material with 15 subsurface soil borings advanced (BH-02-12, BH-07-12, BH-13-12, BH-20-12, BH-21-12, BH-22-12, BH-24-12, BH-25-12, BH-26-12, BH-27-12, BH-28-12, BH-29-12, BH-30-12, BH-31-12, and BH-32-12) and 5 subsurface soil samples collected (BH-02-12, BH-07-12, BH-20-12, BH-21-12, and BH-31-12). Ten of the soil borings were unsuccessful due to shallow water table conditions or standing water in the area.

In March 2013, 13 additional subsurface soil borings were attempted to delineate impacts from leaded tank bottom material and further delineate exceedances of the PADEP MSC for lead. Of these 13 soil borings, 12 were unsuccessful (BH-13-02, BH13-03, BH-13-04, BH13-05, BH-13-06, BH-13-07, BH13-09, BH-13-10, BH-13-11, BH-13-12, BH-13-13, and BH-13-14) due to shallow water table conditions and only one had a subsurface soil sample collected (BH-13-08).

Additional subsurface soil sampling occurred within SWMU 94 area during June of 2014, however, these soil borings were installed as part of tank closure investigations and are discussed in Section 3.5. No leaded tank bottom materials were observed during the June 2014 soil sampling event. Soil samples were analyzed for the entire site COC list.

3.3.6 Subsurface Soil Borings in SWMU 101

In August 2012, to characterize subsurface soil and further delineate exceedances of the PADEP MSC for lead, a total of nine subsurface soil samples were collected from nine soil borings (BH-03-12, BH-16-12, BH-34-12, BH-35-12,

BH-36-12, BH-37-12, BH-38-12, BH-39-12, and BH-40-12).

In March 2013, a total of six subsurface soil samples (BH-13-38, BH-13-39, BH-13-40, BH-13-41, BH-13-42, and BH-13-43) were collected from seven soil borings to characterize subsurface soil and further delineate exceedances of the PADEP MSC for lead from prior sampling events. One soil sample (BH-13-21) was proposed but was not successfully sampled due to a shallow water table.

In June of 2014, subsurface soil sampling occurred within the SWMU 101 area where a total of three subsurface soil samples were collected from four soil borings/monitoring wells (A-171, A-172, A-185, and BH-14-38). One subsurface soil sample from boring BH-14-38 was proposed but was not successfully sampled due to a subsurface obstruction. Soil boring BH-14-38 was originally proposed to be a monitoring well but as previously stated a subsurface obstruction prevented the well installation. These soil borings/monitoring wells were advanced for future quantitative fate and transport modeling purposes.

3.4 PES Butane Rail Loading/Unloading Facility Soil Borings

In March and August 2014, 156 soil borings were advanced by Stantec along the proposed footprint of the PES Butane Rail Loading/Unloading Facility within AOI 5 and on adjacent offsite Philadelphia Electric Company (PECO) offsite property. The limit of disturbance for the PES Butane Rail Facility development is shown in Figure 3. The purpose of obtaining soil samples was to characterize soil quality for potential soil re-use in conjunction with the Complex's Onsite Soil Reuse Plan or soil disposal requirements. The sampling protocols for the PES Butane Rail Facility soil borings followed Section 3.0 of the approved Onsite Soil Reuse Plan.

In March 2014, Stantec advanced 120 borings based upon the sampling protocols from the Onsite Soil Reuse Plan (refer to Table 6 for the PES Butane Rail Facility sample summary listing). Thirty subsurface composite samples and 30 discrete subsurface soil samples were collected from these 120 borings and submitted for laboratory analysis. The composite samples were analyzed for metals and SVOCs, and the discrete samples were analyzed for VOCs only.

In August 2014, Stantec advanced 36 additional borings based upon the sampling protocols from the Onsite Soil Reuse Plan (refer to Table 6 for the PES Butane Rail Facility sample summary listing). Twelve of these soil borings were advanced on PECO property and 24 were advanced within AOI 5. Three surface composite samples and three discrete surface soil samples were collected from the 24 soil borings. Three subsurface composite samples and three discrete subsurface soil samples were also collected from these 36 borings and submitted for laboratory analysis. The composite samples were analyzed for metals and SVOCs, and the discrete samples were analyzed for VOCs only.

Thirty-six of the March 2014 and 24 of the August 2014 boring locations are depicted on Figure 3. The 36 boring locations displayed on Figure 3 represent mostly the VOC grab samples that were obtained in the March sampling event. All of the 24 PES boring locations from the August sampling event are displayed on Figure 3. A summary of the soil analytical results are provided in Table 4 and Table 5. A summary of the PES Rail Line soil nomenclature is provided in Table 6. The laboratory analytical reports are provided in Appendix E.

3.5 Storage Tank Closure and Release Incident Investigation Soil Borings

Numerous ASTs were removed from AOI 5 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 AOI 5 RIR.

Tanks in AOI 5 that have been closed or have exhibited a documented release after August 5, 1989 are being addressed under the Tank Program in a Site Characterization Report/Remedial Action Completion Report (SCR/RACR) that will be submitted separately, but in conjunction with this RIR. These regulated storage tank closure or release events are summarized in the following table.

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

Tank No.	Closure Type	Documented Release (Yes or No)	Additional Comments
GP-1208	Closed in Place	Yes	September 2007 Closure Report Issued
GP-1209	Closed in Place	No	April 2012 Closure Report Issued
GP-1210	Closed in Place	No	April 2012 Closure Report Issued
GP-1212	Closed in Place	No	April 2012 Closure Report Issued
GP-1214	In Service	Yes	Surface and subsurface soil characterization performed.
Tank 207	Removed	Yes	No closure report issued. Surface and subsurface soil characterization performed. Groundwater monitoring well installed.
Tank 223	Removed	Yes	No closure report issued. Surface and subsurface soil characterization performed.
Tank 225	In Service	Yes	No closure report issued. Surface and subsurface soil characterization performed.
Tank 226	Removed	Yes	No closure report issued. Surface and subsurface soil characterization performed.
UST 355	Closed in Place	No	No closure report issued. Surface and subsurface soil characterization performed.

Based on the summary table above, five tanks in AOI 5 have been closed-in-place. Closure and corrective action documentation for four of these tanks (GP-1208, GP-1209, GP-1210 and GP-1212), consistent with requirements of 25 Pa Code §245.561, was prepared by others and previously submitted to the PADEP. Closure and corrective action documentation for GP 1208 was prepared by Secor International Incorporated (SECOR) in September 2007 and closure and corrective action documentation for GP-1209, GP-1210 and GP-1212 was prepared by Stantec in April 2012. Closure and corrective action documentation for UST T-355 was not prepared or submitted to the PADEP. Corrective action documentation was not submitted for the open release incidents associated with tanks GP-1214, 207, 223, 225, and 226. The reported release documentation is provided

under separate cover in the AOI 5 SCR/RACR. It is anticipated that PES will reactivate tanks GP-1208, GP-1209, and GP-1212 in 2017.

Soil borings were advanced at these specified tank or tank dike areas and samples were collected to assist with the general site characterization activities described in this RIR. Soil analytical results from these borings are presented in this RIR for informational purposes only and will be used in a separately prepared tank SCR/RACR for closed-in-place tanks and open releases associated with tanks GP-1214, 207, 223, 225, 226, and UST T-355. This SCR/RACR will be submitted under separate cover to the PADEP in accordance with 25 Pa Code §245 regulations. Thirty-five supplemental borings were completed for tanks GP-1208, GP-1209, GP-1210 and GP-1212 with collection of surface and/or subsurface soil samples. One of the supplemental borings was a shared soil boring (BH-14-28) between tanks GP-1208 and GP-1214. Twenty-five soil borings were completed for tanks GP-1214, 207, 223, 225, 226, and UST T-355 with collection of surface and/or subsurface soil samples. One monitoring well/soil boring was installed (A-186) in conjunction with the other soil borings for Tank 207.

Tank GP-1208

The soil characterization activities for AST GP-1208 included advancement of five soil borings in the former tank area and collection of five shallow soil samples for laboratory analysis. Boring BH-13-36 was advanced in March 2013 and borings BH-14-26, BH-14-27, and BH-14-29 were advanced in 2014 to vertically delineate previous exceedances of benzene reported in numerous previously-installed borings. Subsurface soil samples were also obtained from BH-14-28 in 2014. Soil boring BH-14-28 was a shared soil boring location with the investigation of AST GP-1214 open release incident.

Tank GP-1209

The soil characterization activities for AST GP-1209 included the advancement of five soil borings in the former tank area and collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to delineate previous exceedances of lead, benzene, and cumene reported in previously-installed borings. The borings BH-13-34 and BH-13-35 were advanced in 2013 where surface and subsurface soil samples were obtained. Borings BH-13-145, BH-13-146, and BH-13-147 were advanced in 2014 and surface soil samples were collected.

Tank GP-1210

The soil characterization activities for AST GP-1210 included advancement of ten soil borings in the former tank area and collection of a surface soil samples for laboratory analysis. These borings were installed to delineate previous exceedances of lead, benzene, and cumene. In March 2013, two soil borings (BH-13-31 and BH-13-32) were advanced and two surface soil samples were collected to delineate the exceedance observed at GP1210-NE. Soil sample BH-13-32 was further delineated by three soil borings where three surface soil samples were collected in October 2013 (BH-13-142, BH-13-143, and BH-13-144). Two additional borings were advanced in October 2013, BH-13-148 and BH-13-149. In March 2014, three additional soil borings (BH-14-03, BH-14-04, and BH-14-11) were advanced and three surface soil samples were collected.

Tank GP-1212

The soil characterization activities for AST GP-1212 consisted of 15 surface soil samples. The supplemental soil characterization activities for AST GP-1212 consisted of the advancement of two soil borings (BH-13-29 and BH-13-44) in 2013, in the former tank area, and collection of two surface soil samples for laboratory analysis. Additional horizontal delineation soil borings for soil exceedances of lead and cumene were advanced as follows:

- In October 2013:
    - Three soil borings (BH-13-130, BH-13-131, and BH-13-132) were advanced to delineate former exceedances observed in GP1212-NW. Surface soil samples were collected from all three borings.
    - Three soil borings (BH-13-133, BH-13-134, and BH-13-135) were advanced to delineate former exceedances observed in GP1212-NE. Surface soil samples were collected from all three borings.
    - Three soil borings (BH-13-136, BH-13-137, and BH-13-138) were advanced to delineate exceedances observed in GP1212-SE. Surface soil samples were collected from all three borings.
    - Three soil borings (BH-13-139, BH-13-140, and BH-13-141) were advanced to delineate exceedances observed in GP1212-SW. Surface soil samples were collected from all three borings.
- In March 2014, one soil boring (BH-14-13) was advanced to delineate exceedances observed in BH-13-29. One surface soil sample was collected.

Tank GP-1214

The soil characterization activities for AST GP-1214 consisted of the advancement of three soil borings in the former tank area and collection of surface and subsurface soil samples for laboratory analysis in June 2014. Borings BH-14-28, BH-14-30, and BH-14-31 were advanced in 2014 to horizontally and vertically delineate a previous open release incident of benzene associated with AST GP-1214. The 2014 borings were focused around Pump #2 of the tank and BH-14-28 was a shared soil boring for the supplemental soil characterization for AST GP-1208. Surface and subsurface soil samples were obtained from the 2014 soil borings.

Tank 207

The soil characterization activities for AST 207 consisted of the advancement of four soil borings (BH-14-14, BH-14-15, BH-14-17, and BH-14-18) in June of 2014 in the tank area and the collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to horizontally and vertically delineate a previous open release incident of unleaded gasoline associated with AST 207. One groundwater monitoring well was also installed near AST 207 and surface and subsurface soil samples were obtained.

Tank 223

The soil characterization activities for AST 223 consisted of the advancement of four soil borings (BH-14-21, BH-14-22, BH-14-24, and BH-14-25), in June of 2014, in the former tank area and the collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to horizontally and vertically delineate a previous open release incident of number 6 fuel oil associated with AST 223.

Tank 225

The soil characterization activities for AST 225 consisted of the advancement of four soil borings (BH-14-19, BH-14-20, BH-14-36 and BH-14-37), in June of 2014, in the tank area and the collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to horizontally and vertically delineate a previous open release incident of number 6 fuel oil associated with AST 225.

Tank 226

The soil characterization activities for AST 226 consisted of the advancement of one soil boring (BH-04-07) in 2007 and the collection of one surface soil sample for laboratory

analysis. Characterization activities continued in March 2014 with the advancement of three soil borings (GPBT_03102014_7_4, GPBT_03102014_7_8, and GPBT_03102014_7_12) in the tank area and the collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to investigate soil conditions of SWMU 93 and to characterize soil prior to the development of the Butane Rail Line in AOI 5.

Tank T-355

The soil characterization activities for UST 355 consisted of the advancement of four soil borings (BH-14-32, BH-14-33, BH-14-34 and BH-14-35), in June of 2014, in the tank area and the collection of surface and subsurface soil samples for laboratory analysis. These borings were installed to horizontally and vertically delineate soils around the tank in support of the closure of UST T-355. An additional soil boring (BH-16-1) was advanced in February 2016 to delineate a previous exceedance of benzo(a)pyrene from 2014.

Designated boring locations for these incidents are displayed on Figure 3 and the boring logs are provided in Appendix C. Utilizing a stainless steel hand auger, soil borings were advanced to a minimum depth between 2 feet bgs and the soil water interface at each location in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. The soil samples were submitted to Accutest for analysis. A summary of the surface and subsurface soil analytical results are provided in Table 4 and Table 5, respectively, and the results are discussed in Section 5.5. The laboratory analytical reports are provided as Appendix E.

3.6 Installation of Groundwater Monitoring Wells

As part of the 2007 AOI 5 characterization activities, groundwater monitoring well installation activities were performed February through August, 2007 by Total Quality Drilling, L.L.C. (Total Quality Drilling) of Mullica Hills, New Jersey under direct supervision of Aquaterra and Langan, and in coordination with Sunoco. Eighteen unconfined aquifer monitoring wells were installed to characterize shallow groundwater in AOI 5.

There were no new wells installed during the 2009 site characterization activities.

In November 2012, six unconfined aquifer monitoring wells were installed by Total Quality Drilling under direct supervision of Aquaterra. These wells were installed in response to

PADEP comments and to further delineate LNAPL in the areas of monitoring wells A-14 and A-155.

In addition, six historical unconfined aquifer monitoring wells that were previously installed in AOI 5, were discovered by Aquaterra in 2012 and 2013. These unconfined aquifer monitoring wells were named A-162, A-163, A-164, A-166, A-167, and A-168. These wells were surveyed but no boring or well construction data exists for these wells.

From June to July 2014, additional groundwater monitoring well installation activities were performed by Total Quality Drilling under direct supervision of Aquaterra under direct supervision of Aquaterra. Six of these monitoring wells (A-169, A-170, A-171, A-172, A-173 and A-185) were installed to serve as fate and transport calibration wells. The 7th well (A-186) was installed as part of supplemental tank investigations.

In 2014, one monitoring well was discovered near A-186 and was deemed A-174. There are no boring or well construction logs for A-174 and it was subsequently destroyed several months after being discovered. Additionally in 2014, ten historical monitoring wells were discovered and deemed A-175 through A-184. These wells were surveyed but no boring or well construction data exists for these wells. The locations of all monitoring wells are shown on Figure 3.

Shelby Tube samples were obtained during the well installation of A-170 and A-186 on June 24 and July 3, 2014, respectively. The Shelby Tubes were collected to obtain soil parameters including bulk density, dry density, effective porosity, total porosity, and fraction of organic carbon. The laboratory results for these Shelby Tube samples are provided in Appendix C.

Twelve unconfined aquifer monitoring wells and one lower aquifer monitoring well within AOI 5 were abandoned due to the PES Butane Rail Line development discussed in Section 3.6 of this report. The wells were abandoned by Parrat Wolff, Inc. (Parrat Wolff) of Syracuse, New York, a qualified Pennsylvania Licensed well driller, under the supervision of Aquaterra personnel. The wells that were abandoned include A-13, A-13D (part of AOI 11), A-14, A-43, A-91, A-120, A-121, A-138, A-144, A-145, A-159, and A-160. Recent construction activities have caused monitoring wells A-161 and A-185 to be destroyed. The locations of all abandoned or destroyed monitoring wells are shown on Figure 3.

Prior to the installation of monitoring wells, each well location was cleared for subsurface utilities to 8 feet bgs with a back hoe. During clearing of each location, soil samples were collected directly from the backhoe bucket. Samples were then screened with a photoionization detector (PID) and were collected in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. Unconfined aquifer monitoring wells advanced by the drilling subcontractors utilized split spoon samplers to record lithology. Monitoring wells were constructed with a stickup steel protective casing. Following construction, the monitoring wells were developed in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. Well construction details are provided in Table 2. Boring logs depicting monitoring well construction details and soil descriptions are provided as Appendix C.

3.7 Groundwater Monitoring

Monitoring well gauging activities to collect liquid levels from unconfined aquifer monitoring wells within AOI 5 were performed in May 2007 by Aquaterra. In May 2011, July 2014, and October 2014 either Stantec or Aquaterra performed monitoring well gauging activities to collect liquid levels from all accessible monitoring points within AOI 5. Also in July 2015, Stantec gauged monitoring wells A-15, A-22 and A-166 to identify previous LNAPL detections. These wells did not display LNAPL during this gauging event except for an LNAPL sheen identified in A-166. All well gauging readings from July 2014 and October 2014 are summarized in Table 3a and Table 3b.

The groundwater monitoring data from Table 3a and Table 3b were used to generate unconfined groundwater elevation contours provided as Figure 6 and Figure 7, respectively. Unconfined groundwater flow in both July 2014 and October 2014 appears to be influenced by historic tributaries of the Schuylkill River and the unconfined groundwater flow is generally to the southwest towards the sheet pile wall.

A recent online well radius search was conducted for the entire site using the Pennsylvania Groundwater Information System (PAGWIS) in November 2016 in order to evaluate potential potable well receptors. The results of this search are included in Appendix C.

3.8 Groundwater Sampling

As part of the 2007 site characterization activities, Aquaterra performed a complete round of groundwater sampling from all accessible monitoring wells in AOI 5 in May 2007. Additional sampling events of select wells were conducted by Stantec as part of annual

sampling events. In July and October of 2014, Aquaterra performed two more comprehensive rounds of groundwater sampling in AOI 5. Also in July 2015, Aquaterra sampled monitoring wells A-15, A-22 and A-166 which had previous identified LNAPL thicknesses in July 2014. During the July 2015 sampling event, these wells did not display LNAPL and were sampled for site COCs. All groundwater sampling activities were completed in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. Lower aquifer groundwater monitoring well samples were obtained in the 2007 sampling event but not obtained as part of the 2014 through 2016 sampling events. The monitoring well sampling summary data sheets are provided as Appendix C. All groundwater analytical results are provided in Table 7. The laboratory analytical reports are included as Appendix E.

3.8.1 Sampling Beneath LNAPL

During the AOI 5 comprehensive July 2014 groundwater sampling event, groundwater was obtained from the water column beneath LNAPL in six monitoring wells (A-5, A-136, A-155, A-161, A-178, and WP-A) to respond to a PADEP request in 2014. In a separate event for below-LNAPL groundwater sampling in January 2016, groundwater was obtained from the water column beneath LNAPL in four monitoring wells (A-5, A-136, A-155, and WP-A). As noted above, monitoring well A-161 was recently destroyed due to construction activity.

The below-LNAPL groundwater sampling was conducted to obtain dissolved COC data in groundwater in wells with LNAPL and to use this data for the future fate and transport site-wide quantitative modeling. All sub-LNAPL sampling activities were completed in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. The monitoring well sampling summary data sheets are provided in Appendix C. The results of the groundwater sampling beneath LNAPL are displayed on Figure 10 and provided in Table 7. The groundwater analytical results are presented in Table 7 and Figure 10 and discussed in Section 5.7. The laboratory analytical reports are included in Appendix E.

3.9 Indoor and Ambient Air Sampling

Stantec collected one indoor air sample and one ambient air sample in 2012 as part of the Sunoco, Inc. (R&M) Philadelphia Refinery Remediation Program indoor air sampling report (Stantec, 2013). A copy of the Stantec 2013 indoor air sampling report is provided in Appendix F. The indoor air sample was collected from the Blending and Shipping (B&S)

Office. This building is shown in Figure 12. The one ambient air sample was collected from outside the B&S Office.

The samples were submitted to Columbia Analytical Services of Simi Valley, California (Columbia) for analysis of VOCs by EPA TO-15 method for Evergreen's short list of VOCs plus naphthalene. The results of the samples are provided in Table 8 and are discussed in Section 5.7. The laboratory analytical report for the samples is provided in Appendix E.

GHD conducted a second round of indoor air sampling in March 2016 where GHD collected six indoor air samples and one ambient air sample within AOI 5. A sample was collected from each of the occupied buildings in the AOI. The indoor air samples were collected as follows:

- One sample from the Control Room (Building 625);
- Two samples from the Wharf Dock Office (Building 526);
- One sample from the Wharf Dock Office (Building 501);
- One sample from the GP Dock 2; and
- One sample from the B&S Double Trailer Office (Building 34A/34B).

An indoor air sample was not collected from the PECO substation as the minimal proximity distances for petroleum substances have been met for soil, groundwater, and LNAPL. An ambient air sample was collected from the wharf dock area. The building locations and ambient air sample location are shown in Figure 11 and the results are displayed on Table 8.

The 2016 samples were submitted to LLI for analysis of VOCs by EPA TO-15 method for Evergreen's short list of VOCs plus naphthalene. The results of the samples are provided in Table 8 and are discussed in Section 5.8. The laboratory analytical report for the samples is provided in Appendix E.

3.10 Outdoor Worker Air Sampling

Aquaterra collected five outdoor worker ambient air samples within AOI 5. The outdoor air samples were collected from locations based upon PADEP vapor intrusion guidance documents related to vertical separation distance from the ground surface to a LNAPL source or dissolved groundwater plumes. The locations for the outdoor worker air samples are depicted on Figure 11.

The samples were submitted to Pace for analysis of VOCs by EPA TO-15 method for Evergreen's short list of VOCs plus naphthalene. The results of the samples are provided in Table 9 and are discussed in Section 5.9. The laboratory analytical report for the samples is provided in Appendix E.

3.11 LNAPL Sampling

LNAPL samples for select wells in AOI 5 were previously characterized as described in the CCR. During the 2007 gauging events for AOI 5, Aquaterra collected LNAPL samples from 10 monitoring wells (A-4, A-5, A-7, A-20, A-24, A-48, SW-1, SW-4, A-144 and A-155). An additional LNAPL sample from monitoring well WP-9-8 was collected for characterization purposes in July of 2014 by Aquaterra.

LNAPL was detected in monitoring wells A-15, A-22, A-150, and A-166 during the July 2014 sampling event. A LNAPL sample was planned to be obtained from wells A-15 and A-150 during the October 2014 groundwater sampling event; however, LNAPL was not detected in the wells in October 2014. A LNAPL sample was not obtained for A-22 due to the small amount of LNAPL detected. Lastly, a LNAPL sample was not collected for characterization from A-166 due to proximity of the well to defined plumes.

In July 2015, Stantec gauged monitoring wells A-15, A-22, and A-166 to investigate the previous July 2014 LNAPL detections. These wells did not display LNAPL during this gauging event except for an LNAPL sheen identified in A-166.

LNAPL has historically and sporadically been detected in the 9 Berth Area recovery wells RWBH-1 and RWBH-2. The historical LNAPL thicknesses have varied from not detected, to a maximum thickness in RWBH-1 of 0.27 feet in June 1998, and a maximum thickness in RWBH-2 of 0.71 feet in July 1999. No LNAPL detections were reported in either recovery well from November 2003 until March 2009 when a sheen detection was reported in RWBH-2. However, due to recent LNAPL detections between 2013 and 2016 in these recovery wells, Stantec collected a LNAPL sample from RWBH-2 in November 2015. Maximum LNAPL thickness since 2013 in RWBH-1 was 0.01 feet in August 2016 and 1.94 feet in RWBH-2 in November 2016.

LNAPL samples were collected using a direct sampling or swabbing method in accordance with in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. The LNAPL samples were sent to Torkelson Laboratories (Torkelson) of Tulsa, Oklahoma for

characterization. LNAPL characterization data included product types, density, proportions of product, degree of weathering, and similarities to other LNAPL samples collected at the Complex. The LNAPL sample for RWBH-2 was analyzed by the in-house PES laboratory at the Complex. LNAPL sampling results are provided in Appendix G and modeling results are discussed in Section 6.3.

Three soil samples were collected in 2009 above LNAPL plumes (A-144, A-150, and A-155) and one sample was collected in 2012 above an LNAPL plume (A-161). These results are discussed in Section 5.1. During separate July 2014 and January 2016 groundwater sampling events, groundwater samples were collected from beneath the LNAPL in monitoring wells where the results are discussed in Section 5.7.

3.12 Surveying Activities

Following completion of monitoring well installation and soil boring activities, the newly-installed monitoring wells and soil boring locations were surveyed by Langan. Monitoring wells were surveyed to establish the location and elevation of the inner and outer casing and ground surface at each point. All well elevations were determined to the nearest 0.01 foot relative to mean sea level. All survey activities were overseen by a Pennsylvania licensed surveyor and tied to the NAD 83 state plane horizontal datum and NAVD 88 vertical datum. The survey data for the monitoring wells is presented in Table 2. This survey data was used to update the Geographic Information System (GIS) and site wide database for the Complex and for calculations involving groundwater or LNAPL measurements.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Sample results for AOI 5 supplemental activities were summarized in 61 sample delivery groups provided by Accutest Laboratories and Pace Laboratories and the results were evaluated for usability. The laboratory performed quality assurance and quality control (QA/QC) analyses, including analysis of LCS/LCSDs, MS/MSDs, laboratory duplicates, surrogate spikes, initial and continuing calibrations, serial dilutions, instrument tunes, interference check samples, internal standard area counts 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 5 groundwater, air and soil data met data quality objectives and could be used in the decision-making process.

Several trip blank samples were collected during the soil and groundwater 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 detected in the laboratory method blanks which resulted in potential high bias for the compounds listed above. Recoveries in LCS/LCSDs were within acceptable recovery control limits with the exceptions listed above. Multiple surrogates and MS/SDs recovered outside of the acceptable range as described in detail above.

Based on the QA/QC evaluation of the laboratory data, the groundwater, air and soil data collected during the site characterization activities are considered usable for characterizing the site, identifying compounds of concern, and delineating potential impacts. A more detailed summary of the data quality evaluation is included in Appendix H. For more information regarding data QA/QC, refer to the Evergreen QA/QC Plan and Field Procedures Manual in Appendix D.

5.0 SITE CHARACTERIZATION ANALYTICAL RESULTS

The following sections discuss the analytical results of the site characterization and supplemental site characterization activities performed in AOI 5.

5.1 Surface Soil Analytical Results

The results of the surface soil samples collected in AOI 5 as part of the 2007 characterization activities, as well as the supplemental characterization activities are provided in Table 4. All of the soil samples were collected between the ground surface and two feet bgs and no saturated soils were observed at these depths. The soil sample results were screened against the PADEP non-residential MSCs and the PADEP-approved SSS for lead of 2,240 milligrams per kilogram (mg/kg). Sample locations and exceedances of the MSCs or SSS for lead are shown in Figure 8.

Below is a general summary of the surface soil screening results for the soil sampling activities (outside of RCRA SWMU areas and tank investigation areas):

- COCs detected in surface soil exceeding their respective non-residential soil direct contact MSC or the SSS for lead included benzo(a)pyrene and lead. The SSS for lead was exceeded in two locations (BH-13-27 and A-140). Benzo(a)pyrene was detected

above the PADEP non-residential soil direct contact MSC in two locations (BH-13-28 and BH-14-33).

- Site COCs 1,2-dichloroethane, 1,2,4- TMB, 1,3,5-TMB, benzene, ethylbenzene, ethylene dibromide (EDB), isopropylbenzene (cumene), methyl tertiary butyl ether (MTBE), toluene, xylenes (total), anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(b)fluoranthene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene were not detected in AOI 5 soil samples above their respective PADEP non-residential soil direct contact MSCs.
- All of the surface soil exceedances for benzo(a)pyrene and the SSS for lead in AOI 5 surface soil have been delineated (outside of RCRA SWMU areas and tank investigation areas).

5.2 Subsurface Soil Results

No subsurface soil samples were collected during the 2007 soil investigations. The results of the subsurface soil samples collected in AOI 5 since 2007 are provided in Table 5. All of the subsurface soil samples were collected between two feet bgs and the soil-to-groundwater interface. The soil sample results were screened against the PADEP non-residential soil direct contact MSCs. Sample locations are shown in Figure 9. No subsurface soil samples exhibited detections above the PADEP non-residential direct contact standard (2-15 feet) for any site COCs (outside of RCRA SWMU areas and tank investigation areas).

5.3 Surface Soil Results at RCRA SWMU Areas

The results of the surface soil samples collected within the RCRA SWMU areas of AOI 5 are included in Table 5. All of the soil samples were collected between the ground surface and two feet bgs and no saturated soils were observed at these depths. The soil sample results were screened against the PADEP non-residential MSCs. Sample locations and exceedances of the MSCs or SSS for lead are shown in Figure 9.

As stated in Section 3.3 above, if suspect materials were encountered in surface soil (0-2 feet) within SWMUs 93 and 94 (leaded tank bottom areas) during site characterization activities matching the physical description of the leaded tank bottom materials, then samples were collected for total lead. If the total lead results were above 450 ppm (the PADEP non-residential soil MSC for lead) then samples were analyzed for lead via TCLP,

EPA Test Method 1311. This sampling methodology was performed to determine if leaded tank bottom materials were present in soil. TCLP results are presented in Table 10.

5.3.1 SWMU 93

Leaded Tank Bottom Delineation

In SWMU 93, during the 2007 sampling event, five soil samples (BH-04-07, BH-05-07, BH-06-07, BH-07-07, and BH-08-07) exhibited characteristics resembling the physical description of leaded tank bottoms and were sampled accordingly. Results of the samples are discussed below.

- Soil samples BH-04-07, BH-05-07, and BH-06-07 exhibited total lead concentrations below the PADEP non-residential MSC for lead and were not submitted for further analysis.
- Soil samples BH-07-07 and BH-08-07 (1,250 mg/kg and 506 mg/kg, respectively) were above the PADEP non-residential soil MSC for total lead used at the time of analysis and were submitted for analysis of TCLP lead using EPA Method 1311. The lead concentration in soil sample BH-07-07 of 9.42 milligrams per liter (mg/L) was above the EPA maximum concentration of lead for toxicity characteristic of 5 mg/L, while the lead concentration in soil sample BH-08-07 (0.653 mg/L) was below the EPA maximum concentration. Therefore, the area around BH-07-07 will retain the leaded tank bottom SWMU designation and the area around BH-08-07 will not.
- In June 2009, four surface soil borings, BH-05-09, BH-06-09, BH-07-09, and BH-08-09 were completed around BH-07-07 for delineation of leaded tank bottoms and total lead. The results of these delineation samples are discussed below.
    - Leaded tank bottoms were not observed at BH-05-09 and BH-06-09. Materials resembling leaded tank bottoms were observed in BH-07-09 and BH-08-09. Total lead concentrations in BH-07-09 and BH-08-09 were above the PADEP non-residential soil MSC for lead (748 mg/kg and 563 mg/kg, respectively). TCLP analysis was not conducted on these samples.
- Leaded Tank Bottom material has been delineated within the surface soils of SWMU 93 in AOI 5.

Site COC Delineation

- As a result of the previous lead exceedance observed in sample BH-08-07, four surface soil borings (BH-17-09, BH-18-09, BH-19-09, and BH-20-09) were completed for delineation and sampled for total lead in June of 2009. All of the soil samples did not exhibit total lead detections above the SSS.
- In addition, one soil boring was advanced in 2009 (BH-25-09) as a general soil quality boring and was not utilized for delineation of other soil exceedances. Soil sample BH-25-09 exhibited a total lead detection below the SSS for lead.
- Site COCs 1,2-dichloroethane, 1,2,4-TMB, 1,3,-5-TMB, benzene, cumene, ethylbenzene, EDB, MTBE, toluene, xylenes (total), anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, benzo(g,h,i)perylene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene were not detected in the AOI 5 SWMU 93 area surface soils at concentrations above their respective PADEP non-residential soil MSCs. Lead was not detected at concentrations above the SSS.
- All of the surface soil exceedances of the SSS for lead in SWMU 93 have been delineated.

5.3.2 SWMU 94

Leaded Tank Bottom Delineation

In SWMU 94 during the 2007 sampling event, six soil sample locations (BH-13-07, BH-18-07, BH-20-07, BH-21-07, BH-23-07, and BH-24-07) exhibited characteristics resembling the physical description of leaded tank bottoms and were sampled accordingly. The results of these samples are discussed below.

- The total lead concentrations from soil samples BH-13-07, BH-20-07, BH-21-07, and BH-24-07 were below the PADEP non-residential soil MSC for lead and were not submitted for further analysis.
- The sample collected from soil boring BH-18-07 exhibited a detection (3,190 mg/kg) above the SSS for lead. This sample was submitted for analysis of TCLP lead using EPA Method 1311. The TCLP lead concentration in BH-18-07 (21.8 mg/L) was above the EPA maximum concentration of lead for toxicity characteristic. Therefore, the area around BH-18-07 will retain the leaded tank bottom SWMU designation.

In 2009, four surface soil borings BH-01-09, BH-02-09, BH-03-09, and BH-04-09 were completed around BH-18-07 for delineation of leaded tank bottoms. The results of these delineation samples are discussed below.

- At BH-01-09, BH-03-09, and BH-04-09 the total lead concentration was below the SSS for lead and did not exhibit evidence of leaded tank bottoms.
- BH-02-09 exhibited possible leaded tank bottom materials and total lead concentrations above the SSS (17,900 mg/kg). A TCLP analysis for lead was run and the result (172 mg/L) also was above the USEPA maximum concentration of lead for toxicity characteristic. Therefore, the area around BH-02-09 will retain the leaded tank bottom SWMU designation.

- BH-23-07 contained material that resembled leaded tank bottom materials and the soil was sampled accordingly. The total lead concentration exhibited in the sample was above the PADEP non-residential soil MSC (1,920 mg/kg). This sample was submitted for analysis of TCLP lead using EPA Method 1311. The TCLP lead concentration in BH-23-07 (0.78 mg/L) was below the USEPA maximum concentration of lead for toxicity characteristic. Therefore, the area around BH-23-07 will not retain the leaded tank bottom SWMU designation.
- Leaded Tank Bottom material has been delineated within the surface soils of SWMU 94 in AOI 5.

<u>Site COC Delineation</u>

- For the BH-01-09 lead exceedance referenced above (prior to the approval of the SSS for lead), additional delineation was performed in August 2012 and October 2013 by advancing five soil borings (BH-28-12, BH-13-123, BH-13-124, BH-13-125 and BH-13-126).
  - Three soil samples exhibited no exceedance for lead or other site COCs.
  - Two of the samples (BH-13-125 and BH-13-126) exhibited lead exceedances above the SSS for lead at 2,980 mg/kg and 2,950 mg/kg, respectively.
  - The exceedance at BH-13-125 was delineated by sample BH-14-01 and the exceedance at BH-13-126 was delineated by sample

BH-14-02 in March 2014.

- For the lead exceedances in BH-02-09, BH-04-09 and BH-18-07 referenced above (prior to the approval of the SSS for lead), two additional soil borings (BH-33-09 and BH-34-09) were advanced to the south of BH-02-09 and another two additional soil borings (BH-35-09 and BH-36-09) were advanced to the north of BH-04-09 and BH-18-07.
    - All four soil samples exhibited total lead concentrations below the SSS for lead.
    - BH-33-09 was run for TCLP analysis and was below the EPA maximum concentration of lead for toxicity characteristics.
    - In August 2012, one additional sample was collected (BH-32-12) to further delineate lead in this area and exhibited no exceedances for site COCs.
- Four surface soil borings (BH-21-09, BH-22-09, BH-23-09, and BH-24-09) were completed around BH-23-07 for delineation of lead (prior to the approval of the SSS for lead). Additional delineation of BH-23-07 was conducted in March 2013 by advancing four borings (BH-13-08, BH-13-08, BH-13-11, and BH-13-13). Further delineation of BH-23-07 was performed in October 2013 with borings BH-13-116 and BH-13-117. Soil sample results from all borings exhibited no exceedances for all site COCs.
- Two additional soil borings (BH-37-09 and BH-38-09) were completed to delineate total lead to the south of BH-22-09. The total lead concentration in BH-37-09 of 1,310 mg/kg was above the formerly applied PADEP non-residential soil MSC. Additional delineation was completed in October 2013 with two additional soil borings collected to the south and east of BH-22-09 (BH-13-121 and BH-13-122). Soil sample results from all borings exhibited no exceedances for all site COCs.
- In August 2012, two additional samples (BH-23-12 and BH-33-12) were collected to further delineate the lead exceedance observed at BH-23-09. Both samples exceeded the non-residential soil MSC but were below the SSS for lead (905 mg/kg and 545 mg/kg, respectively). Soil sample results from all borings exhibited no exceedances for all site COCs.
- One soil boring (BH-26-09) was advanced in 2009 for general delineation purposes in the southwest portion of SWMU 94. BH-26-09 exhibited no lead detections above the soil MSC. Two additional soil borings for

general delineation purposes of the western portion of SWMU 94 were advanced at the request of PADEP in March 2013 (BH-13-02 and BH-13-06). The associated soil samples from borings BH-13-02 and BH-13-06 exhibited no COC exceedances.

- In March of 2014, five surface soil samples were collected to further delineate lead detections above the PADEP non-residential soil MSCs within SWMU 94 (BH-14-01, BH-14-02, BH-14-06, BH-14-7, and BH-14-08). All five soil samples exhibited lead detections below the SSS for lead.
- Lead exceedances above the SSS have been delineated within the surface soils of SWMU 94 within AOI 5.

5.3.3 SWMU 101

Surface soil samples were collected at four soil boring locations (BH-25-07, BH-26-07, BH-27-07, and A-142) within SWMU 101 and analyzed for total lead. These soil borings were advanced for general delineation purposes of SWMU 101. The samples collected from soil borings BH-25-07, BH-26-07, and A-142 exhibited total lead concentrations below the PADEP non-residential soil MSC. The sample collected from soil boring BH-27-07 exhibited a lead detection of 3,700 mg/kg which was above the soil MSC and the SSS for lead. Fourteen surface soil borings and soil samples were completed around BH-27-07 for lead delineation from 2009 to 2013. The results of these delineation samples are discussed below:

- Soil samples in 2007 were only analyzed for lead. All other soil samples were analyzed for site COCs.
- Lead was the only site COC detected above the respective PADEP non-residential soil direct contact MSC. Lead was detected above the SSS in one surface soil samples (BH-09-09).
- Lead exceedances were delineated in this area of SWMU 101 in AOI 5.

To address additional information requested by PADEP in the SWMU 101 area, in March 2013, sample BH-13-38 was collected. This sample exhibited a lead concentration (3,600 mg/kg) above the PADEP non-residential surface soil MSC (prior to the approval of the SSS for lead). As a result, nine additional soil borings

were advanced in October 2013 to delineate this area. The results of these delineation samples are discussed below:

- All soil samples were analyzed for site COCs.
- Lead was detected above the SSS in one surface soil sample (BH-13-152).
- Lead exceedances were delineated in this area of SWMU 101 in AOI 5.

In June 2014, one surface soil sample (BH-14-38) was collected as part of a monitoring well installation which was not completed due to a subsurface concrete obstruction. This lead concentration exhibited in this soil sample was below the SSS.

Also in June 2014, three surface soil samples were collected as part of monitoring well installations. Lead concentrations in the three surface soil samples (A-171, A-172, and A-185) exhibited detections below the SSS.

5.4 Subsurface Soil Results at RCRA SWMU Areas

Based on its review of the 2011 AOI 5 SCR/RIR/CUP, the PADEP requested vertical delineation of the surface soil samples with lead exceedances within the SWMU areas. The results of the subsurface soil samples collected within the SWMUs are provided in Table 5. All of the subsurface soil samples were collected between two feet bgs and the soil-to-groundwater interface. The soil sample results were screened against the PADEP non-residential MSCs and the PADEP non-residential direct contact standards (2-15 feet). Sample locations and exceedances of the MSCs are shown in Figure 9.

As stated in Section 3.3 above, if materials were encountered in subsurface soil (2-15 feet) within SWMUs 93 and 94 (leaded tank bottom areas) during site characterization activities matching the physical description of the leaded tank bottom materials, then samples were collected for total lead. Samples were analyzed for lead via TCLP, EPA Test Method 1311, when the total lead results were above 450 ppm (the PADEP non-residential soil MSC for lead). This sampling methodology was performed to determine if leaded tank bottom materials were present in soil. TCLP results are presented in Table 10.

The site COCs 1,2-dichloroethane, 1,2,4-TMB, 1,3,-5-TMB, cumene, ethylbenzene, EDB, MTBE, toluene, xylene (total), anthracene, benzo(a)anthracene, benzo(a)pyrene,

benzo(b)flouranthene, benzo(g,h,i)perylene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene were not detected in AOI 5 SWMU area subsurface soils at concentrations above their respective PADEP non-residential soil MSCs. Refer to Table 5 for analytical results.

5.4.1 SWMU 93

There are no subsurface soil analytical results for SWMU 93 from the August 2012 (BH-08-12, BH-09-12 and BH-11-12) boring installations. Also, during the installation of the March 2013 (BH-13-19, BH-13-20 and BH-13-21) borings associated with the supplemental tank investigations, shallow groundwater table was encountered; therefore, no subsurface samples were collected.

5.4.2 SWMU 94

In August 2012 and March 2013, horizontal and vertical delineation activities were completed in SWMU 94 by advancing six soil borings (BH-02-12, BH-07-12, BH-20-12, BH-21-12, BH-31-12 and BH-13-08) and collecting six subsurface soil samples. All six of the subsurface soil samples exhibited no exceedances of site COCs. Twenty-two other boring installations were unsuccessful due to a shallow groundwater table.

5.4.3 SWMU 101

Nine soil borings (BH-03-12, BH-16-12, BH-34-12, BH-35-12, BH-36-12, BH-37-12, BH-38-12, BH-39-12, and BH-40-12) were advanced in August 2012 and six soil borings (BH-13-38, BH-13-39, BH-13-40, BH-13-41, BH-13-42, and BH-13-43) were advanced in 2013 to further investigate or vertically delineate previous exceedances in SWMU 101. The results of these delineation samples are discussed below:

- All soil samples were analyzed for site COCs and exhibited no exceedance of the PADEP nonresidential soil direct contact MSCs.
- Sample locations and exceedances of the MSCs are shown in Table 5 and Figure 9.

In June 2014, one subsurface soil sample was collected as part of a monitoring well installation which was not completed due to a subsurface concrete

obstruction. This subsurface soil sample (BH-14-38) exhibited no detections above the PADEP non-residential soil direct contact MSC or the SSS for lead.

Also in June 2014, three subsurface soil samples were collected as part of monitoring well installations. The surface soil samples (A-171, A-172, and A-185) exhibited no detections above the PADEP non-residential soil direct contact MSC or the SSS for lead.

5.5 Storage Tank Closure and Release Incident Investigation Soil Borings

The results of the surface and subsurface soil samples collected as part of the storage tank closure and release incidents in AOI 5 are provided in Table 5 and Table 6. Field work for the tank investigation activities was in accordance with the Evergreen QA/QC Plan and Field Procedures Manual. All of the surface soil samples were collected between the ground surface and two feet bgs and no saturated soils were observed at these depths. All of the subsurface soil samples were collected between two feet bgs and the soil-to-groundwater interface. The soil sample results were screened against the PADEP non-residential direct contact MSCs and the SSS for lead (surface soil samples only). Sample locations and exceedances of the PADEP non-residential direct contact MSCs or SSS for lead are shown in Figure 8 and Figure 9. Below are summaries of the supplemental soil sample results by tank area.

<u>Tank GP-1208</u>

The soil characterization sample results for AST GP-1208 included surface soil samples BH-13-36, BH-14-26, BH-14-27, BH-14-28, BH-14-29 and a subsurface soil sample from BH-14-28.

- An exceedance for benzene above the subsurface PADEP non-residential direct contact MSC was reported in the subsurface soil sample.
- There were no other reported site COC exceedances of PADEP non-residential MSCs within the supplemental soil characterization samples.

<u>Tank GP-1209</u>

The supplemental soil characterization sample results for AST GP-1209 included soil samples GP1209-PP, BH-13-34, BH-13-35, BH-13-145, BH-13-146, and BH-13-147.

- An exceedance for cumene above the PADEP non-residential soil direct contact MSCs was reported in one of the surface soil samples.

- There were no other reported site COC exceedances of PADEP non-residential soil direct contact MSCs within the supplemental soil characterization samples.

Tank GP-1210

The soil characterization sample results for AST GP-1210 included soil samples BH-13-31, BH-13-32, BH-13-142, BH-13-143, BH-13-144, BH-13-148, BH-13-149, BH-14-03, BH-14-04, and BH-14-11.

- An exceedance of the SSS for lead was exhibited in one surface soil sample.
- Individual exceedances above the PADEP non-residential soil direct contact MSCs for cumene and benzene were reported in two separate surface soil samples.
- There were no other reported site COC exceedances of PADEP non-residential soil direct contact MSCs within the supplemental soil characterization samples.

Tank GP-1212

The soil characterization sample results for AST GP-1212 included soil samples GP1212-PP, BH-13-29, BH-13-44, BH-13-130 through BH-13-141, and BH-14-13.

- An exceedance for cumene above the PADEP non-residential soil direct contact MSC was reported in one surface soil sample.
- There were no other reported site COC exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the supplemental soil characterization samples.

Tank GP-1214

The soil characterization sample results for AST GP-1214 included soil samples BH-14-28, BH-14-30, and BH-14-31.

- Exceedances for benzene above the PADEP non-residential soil direct contact MSCs were reported in two subsurface soil samples.
- There were no other reported site COC exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the supplemental soil characterization samples.

Tank 207

The soil characterization sample results for AST 207 included soil samples BH-14-14, BH-14-15, BH-14-17, and BH-14-18.

- There were no reported exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the supplemental soil characterization samples.

Tank 223

The soil characterization sample results for AST 223 included soil samples BH-14-21, BH-14-22, BH-14-24, and BH-14-25.

- There were no reported exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the supplemental soil characterization samples.

Tank 225

The soil characterization sample results for AST 225 included soil samples BH-14-19, BH-14-20, BH-14-36 and BH-14-37.

- There were no reported exceedances of PADEP non-residential soil direct contact MSCs or SSS for lead within the supplemental soil characterization samples.

Tank 226

The soil characterization sample results for AST 226 included soil samples BH-04-07, GPBT_03102014_7_4, GPBT_03102014_7_8, and GPBT_03102014_7_12.

- There were no reported exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the soil characterization samples.

Tank T-355

The soil characterization sample results for UST T-355 included soil samples BH-14-32, BH-14-33, BH-14-34, BH-14-35 and BH-16-1.

- An exceedance above the PADEP non-residential soil direct contact MSC was reported in one surface soil sample for benzo(a)pyrene. The benzo(a)pyrene exceedance was delineated.
- There were no other reported site COC exceedances of PADEP non-residential soil direct contact MSCs or the SSS for lead within the supplemental soil characterization samples.

As stated in Section 3.6 above, the analytical data for these borings is presented in this RIR for informational purposes only and will be used in a separately prepared SCR/RACR

for tank closures or open releases associated with tanks GP-1208, GP-1209, GP-1210, GP-1212, GP-1214, 207, 223, 225, 226, and UST T-355. The SCR/RACR will be submitted under separate cover to the PADEP in accordance with 25 Pa Code §245 regulations.

5.6 PES Butane Rail Facility Soil Results

The results of the surface and subsurface soil samples collected from the PES Butane Rail Facility footprint are provided in Table 4 and Table 5. The soil sample results were screened against the PADEP non-residential MSCs and the SSS for lead. Individual grab soil boring sample locations and exceedances of the MSCs or SSS for lead are shown in Figure 8 and Figure 9. Composite samples will not appear on Figure 8 and Figure 9. Refer to Table 6 for the listing of borings associated with each of the above composite soil samples. A summary of the soil sample exceedances is provided below.

- Thirty composite subsurface samples and thirty grab subsurface samples were collected in March 2014. None of the samples exceeded the PADEP direct contact soil MSCs or the SSS for lead.
- Three composite surface samples, three composite subsurface samples, three grab surface samples, and three grab subsurface samples were collected in August 2014. None of the samples exceeded the PADEP soil direct contact MSCs or the SSS for lead.

5.7 Groundwater Results

The results of the unconfined and lower aquifer groundwater samples collected from monitoring wells from 2005 to present are provided in Table 7. The results were screened against the PADEP non-residential used aquifer (TDS<2,500) groundwater MSCs. Figure 10 illustrates the locations where concentrations of COCs were detected above the groundwater MSCs. A summary of the COC concentrations that were above their respective PADEP non-residential groundwater MSCs are presented below.

- In 2009, well A-138, located in the eastern portion of AOI 5, was re-sampled to further assess the elevated cumene concentration of 17,000 micrograms per liter (ug/L) detected during the July 2007 sampling event. Cumene was detected at a concentration of 420 ug/L during the 2009 sampling event, which is below the PADEP non-residential groundwater MSC of 2,300 ug/L.

- Historically, the following COCs have been detected in the unconfined groundwater within monitoring wells at concentrations exceeding their respective PADEP non-residential groundwater MSCs: lead, 1,2,4-TMB, benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene and pyrene.
- Historically, EDB, 1,2-dichloroethane, 1,3,5-TMB, ethylbenzene, cumene, MTBE, toluene, xylenes (total), anthracene, fluorene, naphthalene, and phenanthrene have not been detected in AOI 5 unconfined groundwater above their respective PADEP non-residential groundwater MSCs.
- During the July and October 2014 and the July 2015 sampling events, the same COCs with historic exceedances listed above were detected with concentrations in unconfined groundwater exceeding their respective PADEP non-residential groundwater MSCs. No additional COCs were detected in AOI 5 groundwater above their respective PADEP non-residential groundwater MSCs.
- During the July 2014 sampling event and a separate January 2016 sampling event, groundwater was obtained from the water column beneath LNAPL in select AOI 5 monitoring wells. The same historical COCs were detected beneath the LNAPL and no additional COCs were detected in AOI 5 groundwater above their respective PADEP non-residential groundwater MSCs. These results are presented in Table 7 and Figure 10.
- Lower aquifer groundwater in monitoring well A-19D historically exhibited concentrations of MTBE exceeding the respective PADEP non-residential groundwater MSC. No other COCs have historically been detected in the lower aquifer within AOI 5 above their respective PADEP non-residential groundwater MSCs.
- During the March 2013 sampling event A-19D exhibited concentrations of MTBE similar to historic detections at this well. Additionally, lead was detected in both A-19D and A-21D at concentrations exceeding the respective PADEP non-residential groundwater MSC.
- A PAGWIS 1 mile radius search for registered wells was conducted for AOI 5 in November 2016. The well search results indicated that no public supply wells exist within the 1 mile radius of the Complex. A figure generated from the PAGWIS system is provided in Appendix C.

The groundwater data summarized above and presented in Table 7 and Figure 10 indicate dissolved COCs in unconfined groundwater are delineated within the AOI 5 downgradient boundaries and within the eastern boundary of the Complex in AOI 5.

5.8 Indoor and Ambient Air Sampling Results

Stantec collected one indoor air sample and one ambient air sample in 2012 and GHD collected six indoor air samples and one ambient air sample in 2016. The Stantec 2012 indoor air sampling report and the GHD Air Data Evaluation Letter are provided in Appendix F. To evaluate the potential vapor intrusion into indoor air exposure pathway, indoor air sample results were screened against the current (January 2017) and one-tenth of the current PADEP Non-Residential Indoor Air SHS Vapor Intrusion Screening Values. The results were also compared to the OSHA PELs, the NIOSH RELs, and the ACGIH TLVs. The EPA industrial RSLs were included in the comparison to identify COCs. Initially, the results were compared to the EPA industrial RSLs established at a target cancer risk of 1E-05 and hazard quotient of 0.1. If vapor intrusion is the only potentially complete exposure pathway, these RSL-based screening levels are the prevailing risk-based screening levels for assessment of the indoor air inhalation pathway (PADEP 2015). The results were also conservatively compared to the EPA industrial RSLs established at a target cancer risk of 1E-06 and hazard quotient of 0.1. In September 2016, the EPA established a revised reference concentration (RfC) for 1,2,4-TMB and 1,3,5-TMB based on effects on the nervous system (EPA 2016). The revised RfC (6E-02 mg/m^3) was used to derive non-cancer EPA RSLs applicable to both TMBs. The results of the air samples are presented below.

- None of the indoor air samples from 2012 and 2016 exhibited exceedances of the published PADEP, NIOSH, and ACGIH indoor air screening values.
- None of the indoor air samples from 2012 and 2016 exhibited exceedances of the EPA Industrial RSL established at a 1E-05 target cancer risk and hazard quotient of 0.1.
- Six of the eight indoor air samples from 2012 and 2016 exhibited exceedances for benzene of one-tenth of the PADEP indoor air SHS screening values and the EPA industrial RSLs at a target cancer risk of 1E-06 and a hazard quotient of 0.1 indoor air screening values. The Blending & Shipping Trailer indoor air sample (AOI5-AI-16-006) also exhibited exceedances for 1,2,4-TMB and 1,3,5-TMB compared to one-tenth of the PADEP indoor air SHS screening values.
- The 2016 Control Room indoor air sample (AOI5-AI-16-001) was the only air sample

that did not exhibit exceedances of any of the indoor air screening values.

- Similar to the indoor air samples, the ambient air samples from 2012 and 2016 did not exhibit exceedances of the published PADEP, NIOSH, and ACGIG indoor air screening values.
- Both of the ambient air samples from 2012 and 2016 exhibited exceedances for benzene of one-tenth of the PADEP indoor air SHS screening values and the EPA industrial RSLs at a target cancer risk of 1E-06 and a hazard quotient of 0.1 indoor air screening values.

It should be noted that some of the laboratory reporting limits were greater than the applicable PADEP screening values. The results of the air samples are provided in Table 8 and building sample locations are displayed in Figure 11.

5.9 Outdoor Worker Air Sampling Results

Aquaterra collected five outdoor worker ambient air samples in 2016 from select locations from within AOI 5 based upon PADEP vapor intrusion guidance documents. The air sample results are provided in Table 9 and outdoor worker ambient air sample locations are displayed in Figure 11.

5.10 LNAPL Characterization Results

As a part of the site characterization activities in 2007, LNAPL samples were collected from 10 monitoring wells (A-4, A-5, A-7, A-20, A-24, A-48, A-144, A-155, SW-1, and SW-4) in AOI 5. More recently, additional LNAPL samples were collected in July 2014 at WP-9-8 and in November 2015 at the 9 Berth Area recovery well RWBH-2. LNAPL characterization results are presented in Appendix G. Appendix G also includes previous LNAPL characterization data for AOI 5 which was obtained as part of the CCR. The extent of LNAPL in AOI 5 and the apparent thickness of LNAPL was measured during the October 2014 gauging event, and further clarified during the July 2015 gauging event, as illustrated in Figure 12.

The previous LNAPL characterization data for AOI 5 (obtained as part of the CCR and the 2007 site characterization activities), and the 2014 and 2015 LNAPL characterization data is provided in Appendix G. Based on the LNAPL characterization performed by Torkelson during the CCR and the site characterization activities and the recent PES laboratory results for RWBH-2, there are three LNAPL mixtures in AOI 5. These include previous

designations of: lube oil, middle distillate and residual oil. As of July 2016, new LNAPL site-wide classifications were adopted with definitions as follows:

- Light Distillates - Light distillates include liquid petroleum gas (LPG), aviation gasoline, gasoline, and naphtha. The samples grouped into the light distillate category included samples that were characterized to be more than 90 percent gasoline, heavy virgin naphtha or reformed light naphtha. The light distillate samples have an average viscosity of 0.67 centipoise and an average density of 0.78 g/ml.
- Middle Distillates - Middle distillates include kerosene, jet fuel, diesel fuels, and light fuel oils. The samples grouped into the middle distillate category included samples that were characterized to be more have an average viscosity of 3.72 centipoise and an average density of 0.83 g/ml.
- Mixes of Light/Middle Distillates - The samples grouped into the light/middle distillate category included samples that were characterized to be intermediate mixes of light and middle distillate products. The light/middle distillate samples have an average viscosity of 0.85 centipoise and an average density of 0.80 g/ml.
- Heavy Distillates - Heavy distillates include fuel oil, residual oil, and heavy atmospheric gas oil. The heavy distillate samples have an average viscosity of 5.8 centipoise and an average density of 0.9 g/ml.
- Residuum - Includes waxes and asphalts.
- Crude oil.

Based on the new classifications, Middle Distillate and Heavy Distillate LNAPL plumes currently exist in AOI 5. LNAPL that has not been analyzed for type and does not have a well within close proximity to associate LNAPL type is identified as "Unknown." These new classifications are displayed on Figures 10 and 12.

LNAPL characterization results are presented in Table G.1 of Appendix G. The LNAPL product types summarized in Table G.1 were applied to the October 2014 gauging data (or November 2015 gauging data in the case of RWBH-2) to generate the LNAPL plumes illustrated in Figure 12.

Based on the LNAPL type, delineation of LNAPL bodies, groundwater flow/gradients, and the LNAPL modeling performed as part of the CCR, LNAPL within AOI 5 is assumed to be stable and immobile. Additionally, the low concentrations of dissolved COCs detected in

groundwater samples collected beneath LNAPL indicate the LNAPL bodies within AOI 5 are a not a significant source for dissolved COCs in groundwater. Therefore, no additional LNAPL modeling was completed as part of this RIR.

6.0 FATE AND TRANSPORT EVALUATION

The following sections describe the qualitative fate and transport evaluation completed in AOI 5. This fate and transport evaluation is provided in more detail in Appendix I. A quantitative assessment utilizing the site-wide groundwater model will be presented in a future submittal.

6.1 Soil

No fate and transport modeling was completed for the soil analytical results since the soil-to-groundwater pathway is evaluated through groundwater data. Potential exposure pathways for AOI 5 are discussed in more detail in Section 9.

6.2 Groundwater

In September 2015, representatives from Evergreen's team, PADEP and EPA met to discuss the F&T approach for the Complex. It was agreed upon during the meeting that initial AOI RIRs would contain a summary of the groundwater characterization results and identify where the groundwater MSCs were exceeded throughout the Site, not only at the Point of Compliance. To achieve this, the RIR would include an evaluation of groundwater analytical data, groundwater flow direction and groundwater velocity to evaluate the potential for groundwater in exceedance of the MSC to migrate off-site. In addition, Evergreen, its consultants, and the PADEP agreed that the RIRs would include a qualitative assessment of F&T and that a site-wide quantitative assessment would be prepared under separate cover using a groundwater model to support attainment in the Final Report. A qualitative assessment of F&T of COCs in groundwater in AOI 5 is provided in Appendix I. The qualitative assessment includes information regarding the following conditions in AOI 5:

- Geologic framework;
- Hydrogeologic conditions;
- Hydrologic conditions;

- Anthropogenic features (such as the sheet pile wall along the Schuylkill River); and
- COC temporal trends and spatial distribution.

6.3 LNAPL

As part of the 2013 AOI 5 SCR/RIR/CUP (included in Appendix J), Evergreen evaluated LNAPL mobility across the site using the API LNAPL Model as a tool for assessing LNAPL volume, mobility, and recoverability across the Complex. Based on consistently detected LNAPL types, relatively stable LNAPL distribution, consistent historical groundwater flow conditions and previously completed API LNAPL Model evaluations, LNAPL in AOI 5 is considered to be stable and immobile. No new LNAPL modeling was completed as part of this report. Additionally, the low concentrations of dissolved COCs detected in groundwater samples collected beneath LNAPL indicate the LNAPL plumes within AOI 5 are a not a significant source for dissolved COCs in groundwater.

7.0 CONCEPTUAL SITE MODEL

A preliminary conceptual site model (CSM) for the Complex, including AOI 5, was presented in the CCR. The CSM for AOI 5 was later refined as part of the 2007 AOI 5 SCR and 2013 AOI 5 SCR/RIR/CUP. Data collected from site characterization activities completed since the submittal of the 2013 AOI 5 SCR/RIR/CUP were used to further refine the CSM. These historical reports are provided in Appendix J. The current CSM for AOI 5 is described in the following sections:

7.1 Description and Site Use

AOI 5 is comprised of a wedge-shaped section of land located in the southern most portion of the Complex that encompasses approximately 114 acres. AOI 5 is bordered to the north and northwest by Penrose Avenue and the George Platt Bridge, an industrial facility to the east, and the Schuylkill River to the south and southwest. Prior to August 1994, the area was owned by Chevron who acquired the Complex from a merger with Gulf Oil Company. Existing usage within AOI 5 consists primarily of product tankage, old warehouses, and docks, a loading rack and scale house, and two pump houses. PECO operates a separately fenced substation in the northern area and PES recently constructed a rail system for

butane loading/unloading within AOI 5. A stormwater separator and hazardous waste storage area are located in the southwestern portion of AOI 5.

AOI 5 is located within a fenced and secured area to prevent unauthorized access. Prior to any work being completed within AOI 5, appropriate work permits, safety and security measures must be approved by PES Refining Complex personnel. AOI 5 is under the control of PES's health and safety administrative procedures and is regulated by OSHA. The current and future intended use of AOI 5 is non-residential.

7.2 Geology and Hydrogeology

The following describes geologic and hydrogeologic conditions in AOI 5:

- The depth to bedrock beneath AOI 5 is estimated to be approximately 90 ft bgs;
- The Lower Sand overlies bedrock throughout AOI 5;
- Fill varies in composition across AOI 5 and includes sands and gravels, brick, wood fragments and cinder ash up to 21 feet thick. Fill thickness tends to increase to the north;
- The Alluvium is present throughout AOI 5 and ranges in thickness from approximately 20 feet to up to 47 feet near the Schuylkill River. Based on the available lithologic data, the alluvium deposits in AOI 5 generally consist of two distinct stratigraphic layers, a clay layer and a silt layer;
- Based on available soil boring logs, the Trenton Gravel is not present beneath AOI 5;
- Lower/Middle Clay ranges in thickness from 0 feet 23 feet and appears to be fairly extensive throughout AOI 5. The Lower/Middle Clay is believed to pinch out to the southeast in the direction of the confluence of the Schuylkill and Delaware Rivers. Where present the Lower/Middle Clay functions as a confining bed to the lower sand aquifer.
- The hydrogeologic framework for AOI 5 consists of three layers. Layer one is the combined anthropogenic fill and Holocene alluvium (which is referred to as the unconfined aquifer makes up the water table aquifer). At depth and where less permeable, the alluvium also acts as a leaky confining unit. Layer two is the Lower/Middle Clay confining unit (referred to as the clay aquitard). Layer three is the Lower Sand which is a semi-confined to confined aquifer;
- Groundwater flow in the unconfined aquifer is generally to the south towards the Schuylkill River;

- Unconfined groundwater flow appears to be influenced by historic in-filled tributaries of the Schuylkill River;
- Unconfined groundwater flow in AOI 5 is influenced by the presence of the sheet pile bulkhead which extends along the AOI's boundary with the Schuylkill River and is keyed into the alluvium clay. As a result, limited groundwater mounding behind the sheet pile wall has been observed in AOI 5.

7.3 Compounds of Concern

The following summarizes relevant information concerning COCs by media in AOI 5:

Soil

- Benzo(a)pyrene and lead are the only COCs in surface soil detected above the PADEP non-residential soil direct contact MSCs or the SSS for lead (outside of RCRA SWMU areas and tank investigation areas). Areas where these COCs exceeded either the PADEP non-residential surface soil direct contact MSCs or the SSS for lead have been delineated.
- Benzene, cumene and lead are the only COCs in surface soil detected above the PADEP non-residential soil direct contact MSCs or the SSS for lead in tank investigation areas. Areas where these COCs exceeded either the PADEP non-residential surface soil direct contact MSCs or the SSS for lead have been delineated.
- Lead is the only COC in surface soil detected above the SSS for lead in RCRA SWMU areas. Areas where this COC exceeded the SSS for lead have been delineated.
- No COCs in subsurface soil were detected above the PADEP subsurface soil direct contact MSCs outside of the tank investigation areas.
- Benzene and cumene are the only COCs in subsurface soil detected above the PADEP subsurface soil direct contact MSCs in the tank investigation areas.

Groundwater

- 1,2,4-TMB, benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, lead, and pyrene are the COCs in unconfined groundwater that were detected above their respective PADEP non-residential groundwater MSCs.

- MTBE and lead are the COCs in the lower aquifer groundwater that were detected above their respective PADEP non-residential groundwater MSCs.

Indoor Air

- No COCs in indoor air were detected above the PADEP indoor air SHS screening values during the 2012 and 2016 indoor air sampling events.

7.4 LNAPL Distribution and LNAPL Mobility

The following summarizes relevant information concerning LNAPL distribution in AOI 5:

- There are two different identified types or mixtures of LNAPL identified in AOI 5; these consist middle distillates and heavy distillates. LNAPL that has not been analyzed for type is identified as "Unknown."
- Based on API modeling results and historic distribution, LNAPL in AOI 5 is contained within the boundary of the Complex and does not appear to have to the potential to migrate off-site due to its low mobility and the presence of the sheet pile bulkhead.

7.5 Fate and Transport of COCs

- No fate and transport modeling was completed for the soil. The soil-to-groundwater pathway is evaluated through groundwater attainment with a site-specific standard.
- A qualitative assessment was completed to assess the potential fate and transport of dissolved petroleum impacts and refine the current CSM for AOI 5.
- For the AOI 5 CSM plume stability assessment, benzene, the most mobile of the COCs, was the focus, but all COCs that exceeded their respective PADEP non-residential MSCs were included in the trend analysis. The plume stability assessments for these compounds indicate their plumes are either decreasing or stable (refer to Appendix I).
- Two areas in AOI 5 have been identified as potential source areas for groundwater petroleum impacts (east and west source areas). The east source area is related to a heavy distillate LNAPL plume located to the north of the former warehouse building. Based on the current plume stability assessment,

the east source area is stable, and has attenuated with respect to benzene. Also, due to the presence of an underlying clay aquitard (Holocene clay) and the sheet pile wall, the east plume is unlikely to migrate further or reach any potential receptors. The west source area is related to several isolated middle distillate LNAPL plumes. Concentration trends suggest this source area is stable. Due to the plume stability and the presence of an underlying clay aquitard (Holocene clay and lower/middle clay) and presence of a sheet pile wall, the west plume is unlikely to migrate further or discharge to the Schuylkill River.

- The MTBE and lead exceedances identified in the lower aquifer will be addressed in the separate site-wide fate and transport analysis.

7.6 Potential Migration Pathways and Site Receptors

The following summarizes potential migration pathways and site receptors for AOI 5.

- AOI 5 is situated within a fenced and secured area to prevent unauthorized access.
- The potential direct contact pathway to soil greater than two feet is deemed incomplete based on PES's on-site permit and PPE procedures which limit exposure to soil encountered in excavations.
- The potential direct contact pathway to groundwater is deemed incomplete based on PES's on-site permit and PPE procedures which limit exposure to groundwater that may be encountered in excavations.
- COC concentrations in potential indoor air receptors are not above the PADEP indoor air SHS screening values.
- LNAPL is contained within the boundaries of AOI 5. The potential direct contact pathway to LNAPL is deemed incomplete based on PES's on-site permit and PPE procedures which limit exposure to groundwater that may be encountered in excavations.
- Dissolved phase COCs in the unconfined aquifer above the groundwater MSCs are contained within the boundary of AOI 5 or the Complex. Evergreen will prepare a separate site-wide fate and transport analysis using the site-wide quantitative model to further assess the extent of dissolved phase COCs in groundwater and their potential impact to receptors.

- The areas with surface soil concentrations above COC direct contact MSCs and lead above the SSS will be remediated by Evergreen to eliminate the potential exposure pathway. The remediation activities will be discussed in a separate Complex-wide Cleanup Plan.
- A recent online well radius search was conducted for the entire site using the PAGWIS in November 2016 in order to evaluate potential potable well receptors. Based on the PAGWIS search completed in 2016, there are no existing public or private water supply wells within a 1 mile radius of the Complex boundary.

8.0 REMEDIAL SYSTEM UPDATE

The 9 Berth Total Fluids Recovery System is the only remediation system located in AOI-5. This system was shut-down in January 2009 as a result of freezing conditions and due to the lack of LNAPL in the vicinity of the system. The system has remained offline since January 2009. The LNAPL evaluation discussed in Section 6.3 confirmed that the LNAPL in the vicinity of the 9 Berth System was generally immobile.

The 9 Berth Total Fluids Recovery System consisted of total fluids (groundwater and LNAPL) recovery from two recovery wells (RW-BH1 and RW-BH2) using electric, submersible pumps. The recovery wells were gauged weekly as part of the recovery system maintenance and monitoring program to ensure the system was operating as designed. Operation and maintenance data for this system, as well as well gauging and sampling data for AOI 5, had previously been reported to the PADEP and EPA in the remediation status reports for the Complex.

The volume of LNAPL recovered from either well cannot be ascertained based on the system discharge configuration. Total fluids were pumped directly into a closed benzene NESHAP-compliant sewer, which discharged to the Girard Point Wastewater Treatment Plant. The total fluids recovery for the system was at least 4,265,862 gallons of groundwater and LNAPL as last reported in the first quarterly remediation status reports of 2009.

As mentioned in previous sections, recent site-wide groundwater gauging events have indicated an increase in LNAPL within the recovery wells of the 9 Berth Total Fluids Recovery System. Evergreen will monitor the conditions at the 9 Berth Total Fluids Recovery System as part of the Complex-wide Cleanup Plan.

9.0 EXPOSURE ASSESSMENT

9.1 Human Health

A human health risk assessment has been completed for lead in site soils, as summarized in Section 1.4. Soil results that exceed the SSS for lead, or the non-residential direct contact MSC for the other COCs, are to be addressed through pathway elimination under the SSS or through engineering controls, the details of which will be identified in the Complex-wide Cleanup Plan. Groundwater results that exceed the non-residential MSC at the point of compliance will be addressed through engineering controls or by pathway elimination under the SSS, and will also be identified in the Complex-wide Cleanup Plan.

9.2 Ecological

The majority of AOI 5 is covered with impervious surfaces. Some areas are covered by soil and gravel; however, they are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. In July 2013, a request was submitted to the Pennsylvania Natural Diversity Inventory (PNDI) database to identify potential endangered, threatened and special concern wildlife near the project area. The PNDI search from July 2013 identified one potential impact to the Eastern Red-bellied Turtle under the jurisdiction of PA Fish & Boat Commission (PAFBC). Coordination with PAFBC resulted in a "no impact" determination as long as no wetlands, open water areas, streams or ponds are to be disturbed. Within AOI 5, wetlands, open water areas, streams or ponds do not exist and therefore the project will not result in impacts to the Eastern Red-bellied Turtle. PAFBC's July 2013 response was valid for two years and was extended in April 2015, making it valid through April 2017. The agency notification and response letters are included in Appendix A.

A new PNDI search was conducted on May 7, 2015 in response to a public notice issued by U.S. Army Corps of Engineers on May 4, 2015, which requires updates to all PNDI receipts dated prior to May 4, 2015 due to listing of the northern long-eared bat as a threatened

species under the Endangered Species Act. The May 7, 2015 PNDI search did not result in any additional potential impacts to threatened or endangered species. The updated PNDI search is included in Appendix A.

No surface water features are located in AOI 5. The nearest surface water body to AOI 5 is the Schuylkill River, which borders the western and southern boundary. A sheet pile wall is present between AOI 5 and the Schuylkill River as illustrated in Figure 2. Groundwater interaction with surface water/sediment is restricted by the sheet pile wall. Evergreen will be examining site-wide surface water compliance in future reporting.

10.0 COMMUNITY RELATION ACTIVITIES

A Community Relation Plan (CRP) that includes public involvement with local residents to inform them of the anticipated investigations and remediation activities was completed as part of the original NIR submittal in 2006. A revised NIR was submitted in 2014. The purpose of the 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 remediation program at the Site. This plan incorporates aspects of public involvement under both PADEP's Act 2 program and EPA's RCRA Corrective Action program. Sunoco held an initial public meeting to present the strategy and give a status update of the project. As part of the CRP, Sunoco has presented updates on the remediation program to the Community Action Plan (CAP) on an as requested basis. The CAP meets on a monthly basis and includes members of the community, local officials and PES employees.

This report and future Act 2 reports will include the appropriate municipal and public notices in accordance with the provisions of Act 2. Notices will be published in the Pennsylvania Bulletin and a summary of the notice will appear in a local newspaper. A copy of the original NIR, the 2014 NIR and the Act 2 report notifications for this RIR are included in Appendix A.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the completed activities, the following conclusions and recommendations have been developed for AOI 5:

SOIL

Soil in Non-SWMU Areas

- Eight non-SWMU surface soil locations (seven in the eastern tank farm area) exhibited exceedances above either the SSS for lead, or the non-residential soil direct contact MSCs for benzene, cumene, or benzo(a)pyrene. These areas have been delineated and will be addressed by Evergreen as part of the forthcoming Complex-wide Cleanup Plan.
- Eight non-SWMU subsurface soil locations (all in the eastern tank farm area) exhibited exceedances above the non-residential soil direct contact MSC for either benzene or cumene.
- PES Butane Rail Facility surface and subsurface soils did not exhibit exceedances of the non-residential soil direct contact MSC or SSS for lead.
- With regard to the potential direct-contact pathway to subsurface soil within AOI 5 (i.e., greater than 2 feet deep) the direct contact pathway is considered incomplete because of on-site procedures and PPE requirements that protect onsite workers from exposure. The soil-to-groundwater pathway is addressed through groundwater attainment with a site-specific standard.

Soil Within SWMUs

- SWMU 93 contained one soil sample result of documented leaded tank bottoms with a TCLP result that exceeded the EPA maximum concentration of lead for toxicity characteristic. This leaded tank bottom sample did not exceed the SSS for lead. No other samples exceed the current SSS for lead. The documented leaded tank bottoms have been delineated and will be addressed by Evergreen as part of the forthcoming Complex-wide Cleanup Plan.
- SWMU 94 contained four soil sample results exceeding the SSS for lead. Two of these soil sample results are classified as documented leaded tank bottoms based upon the TCLP result. The areas with lead above the SSS and documented leaded tank bottoms have been delineated and will be addressed by Evergreen as part of the forthcoming Complex-wide Cleanup Plan.

- SWMU 101 contained four soil sample results with exceedances of the SSS for lead. These areas have been delineated and will be addressed by Evergreen as part of the forthcoming Complex-wide Cleanup Plan.
- With regard to the potential direct-contact pathway to subsurface soil within SWMUs (i.e., greater than 2 feet deep) and the soil-to-groundwater pathway, the direct contact pathway is considered incomplete because of on-site procedures and PPE requirements that protect onsite workers from exposure. The soil-to-groundwater pathway is addressed through groundwater attainment with a site-specific standard.
- A SWMU Closure letter will be forwarded under separate cover to request EPA's concurrence that no further investigation is necessary for SWMUs 93, 94, and 101 based on the characterization work completed. The letter will also request EPA's concurrence that no further action will be necessary once the delineated impacted soils in SWMUs 93, 94, and 101 are remediated in accordance with the PADEP and EPA-approved Cleanup Plan.

GROUNDWATER

- Unconfined (water table) groundwater flow is generally to the south towards the Schuylkill River. Unconfined groundwater flow appears to be influenced by in-filled historic tributaries of the Schuylkill River as indicated by the valley-like gradient patterns in the vicinity of these features due to the contrast in hydraulic conductivity between natural and fill materials. Unconfined groundwater flow in AOI 5 is also influenced by the presence of the sheet pile bulkhead which extends along the AOI's boundary with the Schuylkill River and is keyed into the Holocene clay. Localized groundwater mounding is apparent behind portions of the wall.
- Nine COCs [lead, 1,2,4-TMB, benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, and pyrene] were detected in unconfined groundwater during the July 2014 and October 2014 groundwater sampling events at concentrations above their respective used-aquifer, non-residential groundwater MSCs. These and other historic groundwater quality results will be used by Evergreen in a site-wide quantitative groundwater model and fate and transport analysis to further evaluate the extent of groundwater impacts and potential exposure to receptors.
- Based on qualitative groundwater trends, the presence of the sheet pile wall, and groundwater flow direction in the unconfined aquifer, concentrations of the above mentioned dissolved COCs are delineated within AOI 5 and are not expected to

exceed the groundwater MSCs at the site boundary or affect site receptors (Schuylkill River to the west and off-site industrial areas to the east).

- Unconfined groundwater samples collected from beneath LNAPL in select monitoring wells exhibited similar historical COCs concentrations compared to monitoring wells without LNAPL. These results, as well as other dissolved COC results above the MSCs will be used in the site-wide fate and transport analysis being prepared under separate cover.
- MTBE and lead were detected in lower aquifer groundwater during the March 2013 groundwater sampling event at concentrations above their respective used-aquifer, non-residential groundwater MSCs. These results, as well as other dissolved COC results above the MSCs will be used in the site-wide fate and transport analysis being prepared under separate cover.
- Excavations in AOI 5 are governed by PES's permitting procedures which limit potential exposures to groundwater that could be encountered in excavations.
- Groundwater results that exceed the non-residential MSC at the point of compliance will be addressed through use of engineering and institutional controls and/or by pathway elimination and will also be addressed in the Complex-wide Cleanup Plan.
- Based on the PAGWIS search completed in 2016, there are no existing public or private water supply wells within a 1 mile radius of the Complex boundary. Evergreen intends to implement an UECA that will prohibit the use of groundwater in the Complex for potable purposes.

INDOOR AIR

- Based on the results of the 2012 and March 2016 indoor air samples, none of the buildings within AOI 5 had indoor air samples that exhibited COC exceedances above the PADEP indoor air SHS screening values. However, some of the laboratory reporting limits were greater than the applicable PADEP screening values. These buildings will be further evaluated by Evergreen as part of the forthcoming Complex-wide Cleanup Plan.

LNAPL

- The horizontal extents of the LNAPL plumes within AOI 5, relative to the Complex boundaries, have been delineated. Based on the LNAPL types, LNAPL modeling results and historic groundwater gauging and sampling activities, LNAPL present in AOI 5 is stable and relatively immobile. LNAPL does not appear to have the potential to migrate off-site. LNAPL sheens have not been observed in the Schuylkill

River on the river side of the sheet pile bulkhead.

- There are no complete direct contact exposure pathways for LNAPL within AOI 5 because of on-site permitting procedures and required PPE which limit potential exposure.
- Evergreen will continue to monitor the LNAPL condition at the 9 Berth Total Fluids Recovery System as part of the Complex-wide Cleanup Plan.

12.0 LIST OF CONTACTS

Below is the list of contacts associated with the RIR:

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13.0 SIGNATURES

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

Tiffani L. Doerr, PG
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

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

14.0 REFERENCES

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Table 1
Constituents of Concern
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

METALS	CAS No.
Lead (Total)	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
Ethylene Dibromide (EDB)	106-93-4
Methyl Tertiary Butyl Ether	1634-04-4
Toluene	108-88-3
Xylene (Total)	1330-20-7

SVOCs/ PAHs	CAS No.
Anthracene	120-12-7
Benzo(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Benzo(g,h,i)perylene	191-24-2
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. 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 Evergreen 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.

Table 2
Existing Well Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

AOI #	Well ID	Former Well ID[3]	Well Status/ Description	Disposition of Well	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[2]								References	Product Characterization[5]		
												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.)		Density (g/cc)	Source[6]	Percentage and Product Type(s)
AOI - 5 (Girard Point South Tank Field Area)																							
5	A	–			–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	A-1	–			215288.956	2683608.072	MW	Unconfined	Y	Y	2/24/1986	16	4	6.85	5.81	0.81	-9.19	5	10	Dames & Moore, 1990			
5	A-10	–			215427.902	2682406.215	MW	Unconfined	Y	Y	2/25/1986	15	4	8.28	8.67	3.67	-6.33	5	10	Dames & Moore, 1990			
5	A-11	–			215380.325	2682015.508	MW	Unconfined	Y	Y	2/25/1986	14	4	7.77	4.59	1.09	-8.91	4	10	Dames & Moore, 1990			
5	A-118	–			217109.272	2683070.537	RFI MW	Unconfined	–	–	–	17.5	4	8.3	5.79	–	–	–	–	Handex, 1996			
5	A-119	–	Destroyed		216989.269	2683357.325	RFI MW	Unconfined	–	–	–	12.5	4	10.68	7.09	–	–	–	–	Handex, 1996			
5	A-12	–			215378.884	2682182.748	MW	Unconfined	Y	Y	2/24/1986	14	4	7.57	4.88	1.88	-8.12	3	10	Dames & Moore, 1990			
5	A-120	–	Destroyed		216016.277	2683147.065	RFI MW	Unconfined	–	–	–	17.3	4	9.17	6.51	–	–	–	–	Handex, 1996			
5	A-121	–	Destroyed		215917.121	2682857.226	RFI MW	Unconfined	–	–	–	17.5	4	9.32	6	–	–	–	–	Handex, 1996			
5	A-122	–			215929.834	2682277.55	RFI MW	Unconfined	–	–	–	17.6	4	7.44	6.79	–	–	–	–	Handex, 1996			
5	A-13	–	Destroyed		215611.001	2682674.376	MW	Unconfined	Y	Y	2/27/1986	13	4	8.48	6.93	3.93	-6.07	3	10	Dames & Moore, 1990	0.9015	A-13	90% Lube Oil, 10% Middle Distillate
5	A-132	–	Destroyed		–	–	MW	Unconfined	Y	Y	8/19/1992	16	4	–	10.35	5.35	-4.65	5	10	Dames & Moore, 1992			
5	A-133	–			215804.497	2681282.286	MW	Unconfined	Y	Y	8/19/1992	15	4	13.0236	10.2586	5	-4.7414	5	10	Dames & Moore, 1992	0.9796	A-133	100% Residual Oil
5	A-134	–			215809.959	2681408.542	RFI MW	Unconfined	Y	Y	8/19/1992	15	4	9.14	7.21	2.21	-7.79	5	10	Dames & Moore, 1992			
5	A-135	–			215822.935	2681633.451	RFI MW	Unconfined	Y	Y	8/21/1992	16	4	10.76	8.36	3.36	-6.64	5	10	Dames & Moore, 1992			
5	A-136	–			215556.216	2681692.562	RFI MW	Unconfined	Y	Y	8/20/1992	16	2	8.7	7.52	1.52	-8.48	6	10	Dames & Moore, 1992	0.9796	A-136	75% Residual Oil, 25% Middle Distillate
5	A-137	–			215161.003	2683597.259	MW	Unconfined	Y	Y	8/19/1992	15	4	8.63	6.29	4.29	-7.71	2	12	Dames & Moore, 1992			
5	A-138	–	Destroyed		216258.29	2683534.1	MW	Unconfined *	Y	Y	12/31/1999	0	–	6.57	6.82	–	–	–	–	–			
5	A-139	–	Damaged	Casing/Monument damaged	215985.03	2683731.8	MW	Unconfined	Y	Y	3/1/2007	15	4	9.12	6.9	4.9	-8.1	2	13	AOI5 Site Characterization			
5,11	A-13D	–	Destroyed		215608.118	2682677.259	MW	Lower Aquifer	Y	Y	11/13/1986	69	4	9.39	7.07	-51.93	-61.93	59	10	Handex, 1996			
5	A-14	–	Destroyed		215554.774	2682948.303	MW	Unconfined	Y	Y	2/26/1986	13	4	10.49	8	5	-5	3	10	Dames & Moore, 1990	0.9143	A-14	90% Lube Oil, 6% Middle Distillate, 4% Aviation Gasoline
5	A-140	–	Damaged	Casing/Monument damaged	215636.991	2683699.414	MW	Unconfined	Y	Y	3/6/2007	17	4	9.887	7.32	5.32	-9.68	2	15	Aquaterra, 2007			
5	A-141	–	Destroyed		215375.014	2683659.534	MW	Unconfined	Y	Y	3/6/2007	17	4	10.218	7.63	5.63	-9.37	2	15	Aquaterra, 2007			
5	A-142	–			214931.26	2683675.641	MW	Unconfined	Y	Y	3/6/2007	15	4	8.555	6.144	4.144	-8.856	2	13	Aquaterra, 2007			
5	A-143	–			215553.453	2683339.643	MW	Unconfined	Y	Y	3/1/2007	10	4	9.502	7.08	5.08	-2.92	2	8	Aquaterra, 2007			
5	A-144	–	Destroyed		215735.556	2682907.264	MW	Unconfined	Y	Y	3/6/2007	17	4	9.435	7.2	5.2	-9.8	2	15	Aquaterra, 2007	0.8753	A-144	80% Middle Distillate, 10% Unk Lt Material, 10% Heavier Material (Crude/Residual)
5	A-145	–	Destroyed		216182.184	2683206.283	MW	Unconfined	Y	Y	3/1/2007	15	4	7.448	5.12	3.12	-9.88	2	13	Aquaterra, 2007			
5	A-146	–			216551.974	2682962.216	MW	Unconfined	Y	Y	3/1/2007	17	4	10.877	11.31	9.31	-5.69	2	15	Aquaterra, 2007			
5	A-147	–			216815.03	2682850.343	MW	Unconfined	Y	Y	3/1/2007	14	4	7.512	7.74	5.74	-6.26	2	12	Aquaterra, 2007			
5	A-148	–			216806.086	2682640.918	MW	Unconfined	Y	Y	3/1/2007	12	4	8.008	5.703	3.703	-6.297	2	10	Aquaterra, 2007			
5	A-149	–			216327.389	2682442.66	MW	Unconfined	Y	Y	3/1/2007	15	4	8.494	5.59	3.59	-8.41	2	12	Aquaterra, 2007			
5	A-15	–			216313.742	2682689.425	MW	Unconfined	Y	Y	2/25/1986	15	4	5.11	4.79	-0.21	-10.21	5	10	Dames & Moore, 1990	0.9356	A-22	Middle Distillate 80%, Heavier Material2 20%
5	A-150	–			215611.769	2682502.234	MW	Unconfined	Y	Y	3/6/2007	17	4	9.64	7.17	5.17	-9.83	2	15	Aquaterra, 2007	0.9015	A-13	Lube Oil 90%, Middle Distillate 10%
5	A-151	–			215824.421	2682128.585	MW	Unconfined	Y	Y	3/1/2007	15	4	7.489	5.1	3.1	-9.9	2	13	Aquaterra, 2007			
5	A-152	–			216072.848	2681986.798	MW	Unconfined	Y	Y	3/6/2007	17	4	4.847	2.43	0.43	-14.57	2	15	Aquaterra, 2007			
5	A-153	–	Unable to Locate		217566.468	2683573.476	MW	Unconfined	Y	Y	3/1/2007	17	4	9.219	9.56	7.56	-7.44	2	15	Aquaterra, 2007			
5	A-154	–	Unable to Locate		216409.62	2681447.71	MW	Unconfined	Y	Y	3/6/2007	17	4	–	–	–	–	2	15	Aquaterra, 2007			
5	A-155	–			216208.292	2681449.43	MW	Unconfined	Y	Y	3/1/2007	15	4	8.389	5.9	3.9	-9.1	2	13	Aquaterra, 2007	0.8777	A-155	75% Mid Distillate, 5% Stoddard Solvent, 10% Unk Lt, 10% Heavier Material
5	A-156	–			216058.146	2681354.572	MW	Unconfined	Y	Y	11/8/2012	5	2	8.882	6.1	5.1	1.1	1	4	Aquaterra, 2012			
5	A-157	–			216278.08	2681413.674	MW	Unconfined	Y	Y	11/6/2012	8	4	8.623	5.8	5.8	-2.2	0	8	Aquaterra, 2012			
5	A-158	–			216131.91	2681604.367	MW	Unconfined	Y	Y	11/7/2012	11.5	4	6.139	6.25	4.75	-5.25	2	10	Aquaterra, 2012			
5	A-159	–	Destroyed		215628.716	2682713.93	MW	Unconfined	Y	Y	11/6/2012	17	4	9.725	6.73	4.73	-10.27	2	15	Aquaterra, 2012			
5	A-16	–	Destroyed		216996.268	2682671.491	MW	Unconfined	Y	Y	2/25/1986	14	4	9.02	6.2	4.7	-5.3	2	10	Dames & Moore, 1990			
5	A-160	–	Destroyed		215622.35	2682922.428	MW	Unconfined	Y	Y	11/6/2012	17	4	9.38	6.36	4.36	-10.64	2	15	Aquaterra, 2012			
5	A-161	–	Destroyed		215940.93	2681309.438	MW	Unconfined *	N	N	11/8/2012	0	–	8.29	5.33	–	–	–	–	Langan 2013	0.8953	A-24	Middle Distillate 80%, Heavier Material2 20%
5	A-162	–			215828.703	2681275.126	MW	Unconfined	N	N	–	–	–	7.41	6.29	–	–	–	–	Langan 2013			
5	A-163	–			215985.24	2681069.787	MW	Unconfined	N	N	–	–	–	10.49	7.29	–	–	–	–	Langan 2013			
5	A-164	–			216038.682	2681178.212	MW	Unconfined	N	N	–	–	–	8.91	6.05	–	–	–	–	Langan 2013			
5	A-166	–			215789.991	2681273.49	MW	Unconfined	–	–	–	–	–	11.2749	9.6949	–	–	–	–	Langan 2014	0.925	A-136	Residual Oil 75%, Middle Distillate 25%
5	A-167	–			216200.322	2681257.275	MW	Unconfined	–	–	–	–	–	9.4552	7.5099	–	–	–	–	Langan 2015			
5	A-168	–			216443.844	2681699.054	MW	Unconfined	–	–	–	–	–	10.6865	7.6957	–	–	–	–	–			
5	A-169	–			215952.71	2681150.05	MW	Unconfined	–	–	6/23/2014	16	2	8.62	6.1	5.1	-9.9	1	–	ns/lm			
5	A-17	–	Destroyed		216877.402	2683572.924	MW	Unconfined	Y	Y	2/27/1986	14	4	8.4	8.37	6.37	-3.63	2	10	Dames & Moore, 1990			
5	A-170	–			215866.68	2681810.94	MW	Unconfined	–	–	6/25/2014	16	2	4.63	2.2	1.2	-13.8	1	–	ns/lm			
5	A-171	–			215555.36	2681590.31	MW	Unconfined	–	–	7/1/2014	16.5	2	7.64	5.2	3.7	-11.3	2	–	ns/lm	0.925	A-136	Residual Oil 75%, Middle Distillate 25%
5	A-172	–			215440.73	2681779.69	MW	Unconfined	–	–	6/24/2014	16	2	6.32	4.7	3.7	-11.3	1	–	ns/lm			
5	A-173	–			215236.856	2682857.336	MW	Unconfined	–	–	6/30/2014	16	2	–	–	–	–	1	–	ns/lm			
5	A-174	–	Damaged	Obstruction in Well	217149.64	2683052.08	MW	Unconfined	–	–	–	–	–	8.02	6.3	–	–	–	–	Aquaterra, 2014			
5	A-175	–			215245.31	2682663.47	MW	Unconfined	–	–	–	–	–	4.73	5	–	–	–	–	–			
	A-176	–			215259.851	2682693.871	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	–			
	A-177	–			215248.638	2682739.38	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	–			
5	A-178	–	Unable to locate		215228.32	2682769.95	MW	Unconfined	–	–	–	–	–	4.55	4.8	–	–	–	–	–	0.9124	A-5	Lube Oil 100%
	A-179	–			215289.455	2682824.02	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	–			
5	A-18	–	Destroyed		217223.174	2683607.501	MW	Unconfined	Y	Y	2/27/1986	12	4	8.47	8.61	6.61	-3.39	2	10	Dames & Moore, 1990			
	A-180	–			215315.67	2682845.926	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	–			
5	A-181	–			215193.2	2682443.66	MW	Unconfined	–	–	–	–	–	6.52	5.3	–	–	–	–	–			
5	A-182	–			215082.92	2682579.97	MW	Unconfined	–	–	–	–	–	6.9	5	–	–	–	–	–			
	A-183	–			215353.968	2682598.093	Mw	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	–			
5	A-184	–	Damaged	Casing/Monument damaged	215355.16	2682611.2	MW	Unconfined	–	–	–	–	–	–	8.2	–	–	–	–	–	0.9124	A-5	Lube Oil 100%
5	A-185	–	Damaged*	Casing/Monument Damaged	215506.55	2681565.83	MW	Unconfined	–	–	6/26/2014	16	2	–	7.7	4.7	-8.3	3	–	ns/lm			
5	A-186	–			217107.28	2682887.99	MW	Unconfined	–	–	7/3/2014	18	2	8.257	5.6	2.6	-12.4	3	–	ns/lm			
5	A-187	–	Reserved		215337.08	2682720.65	MW	Unconfined	–	–	–	–	–	9.4	7.9	–	–	–	–	Stantec, 2015			
5	A-188	–	Reserved		215334.92	2682745.33	MW	Unconfined	–	–	–	–	–	11.48	8.1	–	–	–	–	Stantec, 2015			
5	A-189	–			217438.151	2683359.64	MW	Unconfined	–	–	–	–	–	8.51	5.91	–	–	–	–	–			
5	A-19	–	Destroyed		217570.98	2683558.686	MW	Unconfined	Y	Y	2/27/1986	11.5	4	9.52	8.47	6.97	-3.03	2	10	Dames & Moore, 1990			
5,11	A-19D	–			217562.844	2683562.754	MW	Lower Aquifer	Y	Y	10/30/1986	60	4	10.64	–	–	–	50	10	Dames & Moore, 1990			
5	A-2	–	Destroyed		–	–	MW	Unconfined	Y	Y	2/27/1986	13	4	7.84	–	–	–	3	10	Dames & Moore, 1990			
5	A-20	–	Destroyed		215307.608	2681972.433	MW	Unconfined	Y	Y	2/24/1986	14	4	8.81	–	–	–	4	10	Dames & Moore, 1990	0.9222	A-20	75% Middle Distillate, 25%Heavier Material (Crude/Residual)
5	A-21	–			215629.744	2681388.358	MW	Unconfined	Y	Y	2/25/1986	13	4	8.16	7.77	4.77	-5.23	3	10	Dames & Moore, 1990	0.91	SW-4	70% Middle Distillate, 30% Heavier Material (Crude/Residual)
5,11	A-21D	–			215629.744	2681388.358	MW	Lower Aquifer	Y	Y	10/28/1986	85	4	11.25	7.94	-67.06	-77.06	75	10	Dames & Moore, 1990			
5	A-22	–			216031.531	2680996.159	MW	Unconfined	Y	Y	2/2/1986	15	4	7.95	7.76	2.76	-7.24	5	10	Dames & Moore, 1990	0.9356	A-22	80% Middle Distillate, 20% Heavier Material (Crude/Residual)
5	A-23	–			216384.931	2682142.8	MW	Unconfined	Y	Y	2/27/1986	13	4	6.31	3.79	0.79	-9.21	3	10	Dames & Moore, 1990			
5	A-24	–			215977.199	2681515.23	MW	Unconfined	Y	Y	2/24/1986	14.5	4	5.53	5.56	3.56	-6.44	2	10	Dames & Moore, 1990	0.8953	A-24	80% Middle Distillate, 20% Heavier Material (Crude/Residual)
5	A-25	–			216982.319	2682468.225	MW	Unconfined	Y	Y	2/27/1986	13	4	8.8	8.82	5.82	-4.18	3	10	Dames & Moore, 1990			
5	A-26	–			216793.002	2682167.311	MW	Unconfined	Y	Y	2/27/1986	15	4	8.65	9	5.5	-4.5	4	10	Dames & Moore, 1990			

Table 2
Existing Well Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

AOI #	Well ID	Former Well ID[3]	Well Status/ Description	Disposition of Well	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[2]								References	Product Characterization[5]		
												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.)		Density (g/cc)	Source[6]	Percentage and Product Type(s)
AOI - 5 (Girard Point South Tank Field Area)																							
5	A-27	–			216591.729	2681846.47	MW	Unconfined	Y	Y	2/27/1986	15	4	10.005	9.5	4.5	-5.5	5	10	Dames & Moore, 1990			
5	A-28	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	A-29	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	A-3	–			215784.549	2683411.637	MW	Unconfined	Y	Y	2/24/1986	15	4	8.24	7.66	4.66	-5.34	3	10	Dames & Moore, 1990			
5	A-30	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	A-39	–			215042.061	2683669.345	MW	Unconfined	Y	Y	7/18/1988	13	4	7.68	5.96	2.96	-7.04	3	10	Dames & Moore, 1992			
5	A-4	–			215000.611	2683519.767	MW	Unconfined	Y	Y	2/24/1986	15	4	6.04	5.85	0.85	-9.15	5	10	Dames & Moore, 1990	0.91	A-4	90% Middle Distillate, 10% Heavier Material (Crude/Residual)
5	A-40	–			215200.651	2683591.853	MW	Unconfined	Y	Y	7/18/1988	13	4	8.63	6.02	3.02	-6.98	3	10	Dames & Moore, 1992			
5	A-41	–			215097.421	2683534.984	MW	Unconfined	Y	Y	7/18/1988	13	4	5.6269	5.5372	3	-7.4628	3	10	Dames & Moore, 1992			
5	A-42	–	Destroyed		–	–	MW	Unconfined	Y	Y	7/19/1988	13	4	8.58	7.53	4.53	-5.47	3	10	Dames & Moore, 1992			
5	A-43	–	Destroyed		215588.114	2683119.688	MW	Unconfined	Y	Y	7/19/1988	13	4	10.43	7.89	4.89	-5.11	3	10	Dames & Moore, 1992			
5	A-44	–			215461.963	2683121.49	MW	Unconfined	Y	Y	7/19/1988	13	4	10.01	7.61	4.61	-5.39	3	10	Dames & Moore, 1992			
5	A-45	A-177			215239.036	2682742.137	MW	Unconfined	Y	Y	7/19/1988	13	4	4.72	4.87	1.87	-8.13	3	10	Dames & Moore, 1992	0.9124	A-5	100% Lube Oil
5	A-46	–			215347.166	2682463.884	MW	Unconfined	Y	Y	7/19/1988	12	4	10.82	8.56	6.56	-3.44	2	10	Dames & Moore, 1992	0.8926	A-47	100% Lube Oil
5	A-47	–	Damaged	Casing/Monument damaged	215249.128	2682432.166	MW	Unconfined	Y	Y	7/19/1988	12	4	7.42	5.55	3.55	-6.45	2	10	Dames & Moore, 1992	0.8926	A-47	100% Lube Oil
5	A-48	–			215156.858	2682295.202	MW	Unconfined	Y	Y	7/20/1988	12.5	4	6.45	4.63	2.13	-7.87	3	10	Dames & Moore, 1992	0.91	A-48	70% Middle Distillate, 30% Heavier Material (Crude/Residual)
5	A-49	–			215647.044	2682249.067	MW	Unconfined	Y	Y	7/20/1988	13	4	7.2	6.8	3.8	-6.2	3	10	Dames & Moore, 1992			
5	A-5	–	Damaged	Casing/Monument damaged	215250.57	2682619.59	MW	Unconfined	Y	Y	2/25/1986	18	4	5.01	5.15	1.15	-11.85	4	13	Dames & Moore, 1990	0.9124	A-5	100% Lube Oil
5	A-50	–	Destroyed		–	–	MW	Unconfined	Y	Y	7/20/1988	13	4	9.72	–	–	–	3	10	Dames & Moore, 1992			
5	A-51	–	Destroyed		–	–	MW	Unconfined	Y	Y	7/20/1988	12.5	4	11.24	–	–	–	3	10	Dames & Moore, 1992			
5	A-6	–			215267.871	2682954.07	MW	Unconfined	Y	Y	2/24/1986	15	4	6.74	7.01	4.01	-7.99	3	12	Dames & Moore, 1990			
5	A-7	–			215287.154	2683087.249	MW	Unconfined	Y	Y	2/24/1986	15	4	6.911	6.87	3.87	-6.13	3	10	Dames & Moore, 1990	0.8905	A-7	100% Lube Oil
5	A-8	–	Destroyed		215079.005	2682870.45	MW	Unconfined	Y	Y	2/24/1986	15	4	6.29	5.24	0.24	-9.76	5	10	Dames & Moore, 1990			
5	A-9	–			215096.126	2683089.052	MW	Unconfined	Y	Y	2/24/1986	15	4	5.8	5.95	2.95	-7.05	3	10	Dames & Moore, 1990			
5	A-91	–	Destroyed		216549.935	2683363.427	MW	Unconfined	Y	Y	10/21/1986	13	4	9.88	7.4	4.4	-5.6	3	10	Dames & Moore, 1990			
5	B	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	C	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Dames & Moore, 1987			
5	PZ-1	–	Damaged	Obstruction in well; Blocked at ~2.5 ft bgs	215883.487	2681473.42	RFI Well Point Loc.	Unconfined *	–	–	–	–	–	7.764	4.84	–	–	–	–	Handex, 1996			
5	PZ-2	–			215938.273	2681495.046	RFI Well Point Loc.	Unconfined *	–	–	–	–	–	10.88	5.12	–	–	–	–	Handex, 1996			
5	PZ-3	–			215958.457	2681510.905	RFI Well Point Loc.	Unconfined *	–	–	–	–	–	10.53	5.74	–	–	–	–	Handex, 1996			
5	RW16-2	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Handex, 1996			
5	RW-6S	RW-6			215947.481	2681519.677	RW	Unconfined	–	–	–	14.6	4	8.22	5.22	5.22	5.22	0	–	–			
5	RWBH-1	–	Active		215219.405	2682069.647	RW - Active	Unconfined	Y	–	3/19/1996	11.5	4	5.33	5.36	3.86	-6.14	2	10	Handex, 1996			
5	RWBH-2	–	Active		215220.069	2682108.595	RW - Active	Unconfined	Y	–	3/22/1996	8	4	4.13	4.33	2.33	-3.67	2	6	Handex, 1996	0.91	A-48	70% Middle Distillate, 30% Heavier Material (Crude/Residual)
5	RWM-8	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Handex, 1996			
5	RWM-9	–	Destroyed		–	–	MW	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Handex, 1996			
5	SW-1	–			215437.008	2681673.285	RFI MW	Unconfined	–	–	–	20	4	9.76	7.19	7.19	7.19	0	–	Handex, 1996	0.91	SW-1	70% Middle Distillate, 30% Heavier Material (Crude/Residual)
5	SW-2	–			215458.201	2681632.848	RFI MW	Unconfined	–	–	–	18.6	4	9.94	7.71	–	–	–	–	Handex, 1996			
5	SW-3	–			215491.872	2681564.953	MW	Unconfined	–	–	–	18	4	9.97	7.85	–	–	–	–	Handex, 1996			
5	SW-4	–			215533.919	2681486.195	RFI MW	Unconfined	–	–	–	15.6	4	7.15	7.22	7.22	7.22	0	–	Handex, 1996	0.91	SW-4	70% Middle Distillate, 30% Heavier Material (Crude/Residual)
5	SW-5	–			215654.599	2681321.8	RFI MW	Unconfined	–	–	–	14.6	4	10.49	7.84	7.84	7.84	0	–	Handex, 1996	0.9356	A-22	80% Middle Distillate, 20% Heavier Material (Crude/Residual)
5	SWR-1	–	Inactive		215697.37	2681283.47	RW - Inactive	Unconfined *	–	–	–	–	–	8.28	–	–	–	–	–	–			
5	SWR-2	–	Inactive		215397.239	2681737.115	RW - Inactive	Unconfined	–	–	–	15	4	10.06	8.41	–	–	–	–	Handex, 1996			
5	SWR-3	–	Inactive		215359.059	2681810.735	RW - Inactive	Unconfined	–	–	–	11.6	4	10.61	–	–	–	–	–	Handex, 1996			
5	unknown well	–			–	–	MW	Unconfined *	–	–	–	–	–	–	0	–	–	–	–	–			
5	WP-1	–	Destroyed		215265.302	2682064.502	Temporary Well Point	Unconfined	Y	Y	5/25/1993	6.95	1	–	4.61	0.66	-2.34	4	3	ENSR, 1993, Handex, 1996			
5	WP-10	–	Destroyed		222347.971	2681973.48	MW POINT	Unconfined	Y	Y	6/9/1992	15	2	7.292	4.6012	5	-10.3988	0	10	Dames & Moore, 1993			
5	WP1-1	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/4/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-10	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/26/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-11	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/26/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-12	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/3/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-13	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/15/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-14	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/15/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-15	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/24/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-2	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/4/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-3	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/4/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-4	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/3/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP-14	–			215243.362	2682198.607	Temporary Well Point	Unconfined	–	–	–	9	2	9.12	4.24	–	–	–	–	Handex, 1996			
5	WP1-5	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/3/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-6	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/8/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP16-1	–	Destroyed		216966.376	2682416.412	Temporary Well Point	Unconfined	–	–	–	–	–	–	13.19	–	–	–	–	Handex, 1996			
5	WP16-3	–			216898.621	2682402.462	Temporary Well Point	Unconfined	–	–	–	14.5	2	11.07	7.34	–	–	–	–	Handex, 1996			
5	WP16-4	–	Destroyed		216970.362	2682549.93	Temporary Well Point	Unconfined	–	–	–	–	–	–	9.27	–	–	–	–	Handex, 1996			
5	WP1-7	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/26/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-8	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/26/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP1-9	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	6/3/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP-1a	–	Destroyed		–	–	Temporary Well Point	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Handex, 1996			
5	WP-2	–	Destroyed		215256.247	2682083.943	Temporary Well Point	Unconfined	Y	Y	6/2/1993	6.66	1	–	4.82	1.16	-1.84	4	3	ENSR, 1993, Handex, 1996			
5	WP2-1	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-10	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-11	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-12	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-13	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-14	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-2	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-3	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-4	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-5	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-6	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-7	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-8	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP2-9	–	Destroyed		–	–	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	–	–	–	–	–	1	10	Dames & Moore, 1993			
5	WP-2a	–	Destroyed		–	–	Temporary Well Point	Unconfined *	–	–	–	–	–	–	–	–	–	–	–	Handex, 1996			
5	WP-3	–	Destroyed		215256.45	2682128.553	Temporary Well Point	Unconfined	Y	Y	6/2/1993	8	1	–	5.12	0.12	-2.88	5	3	ENSR, 1993, Handex, 1996			

Table 2
Existing Well Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

AOI #	Well ID	Former Well ID[3]	Well Status/ Description	Disposition of Well	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Soil Boring Log Available (Y/N)	Construction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[2]								References	Product Characterization[5]		
												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.)		Density (g/cc)	Source[6]	Percentage and Product Type(s)
AOI - 5 (Girard Point South Tank Field Area)																							
5	WP3-1	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-10	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-11	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-12	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-2	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-3	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-4	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-5	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-6	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-7	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-8	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP3-9	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/28/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP-3a	--	Destroyed		--	--	Temporary Well Point	Unconfined *	--	--	--	--	--	--	--	--	--	--	--	Handex, 1996			
5	WP-4	--	Destroyed		215009.622	2683231.422	Temporary Well Point	Unconfined	Y	Y	6/2/1993	8.77	1	--	10.73	4.96	1.96	6	3	ENSR, 1993, Handex, 1996			
5	WP4-1	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/1/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP4-2	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/1/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP4-3	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/1/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP4-4	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/1/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP4-5	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/1/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP-4A	--	Destroyed		215009.622	2683231.422	Temporary Well Point	Unconfined	--	--	--	9.5	2	6.7	--	--	--	--	--	Handex, 1996			
5	WP-5	--	Destroyed		215244.767	2682167.862	Temporary Well Point	Unconfined	Y	Y	6/2/1993	7.88	1	--	7.6	2.72	-0.28	5	3	ENSR, 1993, Handex, 1996			
5	WP5-1	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/11/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP5-2	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/11/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP5-3	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/11/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP-5a	--	Destroyed		--	--	Temporary Well Point	Unconfined *	--	--	--	--	--	--	--	--	--	--	--	Handex, 1996			
5	WP-6	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	6/2/1993	6.86	1	--	--	--	--	4	3	ENSR, 1993, Handex, 1996			
5	WP6-1	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP6-2	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP6-3	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP6-4	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP-7	--	Destroyed		215126.582	2682631.124	Temporary Well Point	Unconfined	Y	Y	6/2/1993	7.88	1	--	8.84	3.96	0.96	5	3	ENSR, 1993, Handex, 1996			
5	WP7-1	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP7-2	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP7-3	--	Destroyed		--	--	Temporary Well Point	Unconfined	Y	Y	5/25/1993	10.5	--	--	--	--	--	1	10	Dames & Moore, 1993			
5	WP-8	--			215136.674	2682440.816	Temporary Well Point	Unconfined	Y	Y	6/9/1992	15	2	6.99	3.98	-1.02	-11.02	5	10	Dames & Moore, 1993			
5	WP-9	--	Damaged	Casing/Monument Damaged	215223.177	2682225.999	Temporary Well Point	Unconfined	Y	Y	6/3/1992	15	2	8.57	5.75	0.75	-9.25	5	10	Dames & Moore, 1993			
5	WP9-7	--	Destroyed		216462.196	2681507.693	Temporary Well Point	Unconfined	--	--	--	--	--	--	8.25	--	--	--	--	Handex, 1996			
5	WP9-8	--			216376.53	2681391.26	Temporary Well Point	Unconfined *	--	--	--	--	--	8.87	6.17	--	--	--	--	Handex, 1996	0.8114	WP9-2	Aviation Gasoline 80% , Middle Distillate 20%
5	WP-A	--			215593.701	2681386.916	Temporary Well Point	Unconfined	--	--	--	13	2	9.6	7.35	--	--	--	--	Handex, 1996	0.91	SW-4	Middle Distillate 70% , Heavier Material (Crude/Residual) 30%
5	WP-B	--			215667.228	2681310.505	Temporary Well Point	Unconfined	--	--	--	12	2	10.08	7.12	--	--	--	--	Handex, 1996	0.9356	A-22	80% Middle Distillate, 20% Heavier Material (Crude/Residual)
5	WP-C	--	Damaged	Casing Broken off at grade	215681.178	2681378.371	Temporary Well Point	Unconfined	--	--	--	12.6	2	6.5253	7.0735	--	--	--	--	Handex, 1996			
5	WP-D	--			215913.763	2681483.512	Temporary Well Point	Unconfined	--	--	--	11.6	2	8.26	5.36	--	--	--	--	Handex, 1996			
5	WP-E	--			215985.849	2681621.917	Temporary Well Point	Unconfined	--	--	--	10.5	2	7.35	5.08	--	--	--	--	Handex, 1996			

NOTES:
1. Elevation datum for wells within AOI 5 were suryved to NAVD 88 as a part of this report. Survey completed by Langan as part of Work Plan and Site Characterization Activities.
2. Well construction details were taken directly from well boring logs provided by Handex, Stantec (formerly Secor), Aquaterra or collected from available historic reports. Where no well boring logs exist, no well construction data is listed.
3. Former well IDs were derived from handwritten notes on the logs themselves or the referenced report.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
* - Hydrostratigraphic Unit was assumed based on available data.
Stanport lists disposition of well A-185 as "Casing/Monument Damaged". Well was gauged during July 2014 and October 2014 events.
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
Destroyed or abandoned wells
-- Data could not be located or determined based on available reports

Table 3a
Summary of AOI 5 Groundwater and LNAPL Elevations July 2014
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Specific Gravity (g/cc) Used for GW Correction		Depth to Product (ft btic)	Depth to GW[5] (ft btic)	Apparent LNAPL Thickness (ft)	LNAPL Elevation (ft msl)	Groundwater Elevation (ft msl)	Corrected GW Elevation (ft msl)	TIC Elevation (ft. msl)	Notes
					S.G.[2]	Source[3]								
A-169	215952.842	2681149.425	Monitoring Well	Unconfined			--	4.96	--	--	3.66	3.66	8.62	
A-170	215866.761	2681810.857	Monitoring Well	Unconfined			--	2.85	--	--	1.70	1.70	4.55	
A-171	215555.327	2681590.443	Monitoring Well	Unconfined			--	5.68	--	--	1.91	1.91	7.59	
A-172	215440.922	2681779.717	Monitoring Well	Unconfined			--	4.52	--	--	1.81	1.81	6.33	
A-173	215220.763	2682837.220	Monitoring Well	Unconfined			--	2.78	--	--	1.78	1.78	4.56	
A-174	217149.006	2683052.551	Monitoring Well	Unconfined			--	5.92	--	--	5.02	5.02	10.94	A-174 designation was given to an existing well that was located during the sampling activities and surveyed by Langan personnel.
A-175	215245.157	2682663.584	Monitoring Well	Unconfined			--	4.23	--	--	0.52	0.52	4.75	
A-176	215259.851	2682693.871	Monitoring Well	Unconfined	0.9124	A-5	4.00	4.20	0.20	0.56	0.36	0.54	4.56	
A-177	215248.638	2682739.380	Monitoring Well	Unconfined			--	3.67	--	--	0.91	0.91	4.58	
A-178	215228.364	2682769.779	Monitoring Well	Unconfined	0.9124	A-5	3.36	4.00	0.64	1.23	0.59	1.17	4.59	
A-179	215289.455	2682824.020	Monitoring Well	Unconfined	0.9124	A-5	2.77	4.80	2.03	5.64	3.61	5.46	8.41	
A-180	215315.670	2682845.926	Monitoring Well	Unconfined	0.9124	A-5	3.10	3.15	0.05	3.61	3.56	3.60	6.71	
A-181	215193.272	2682443.584	Monitoring Well	Unconfined			--	2.10	--	--	4.50	4.50	6.60	
A-182	215082.884	2682579.928	Monitoring Well	Unconfined			--	5.23	--	--	1.69	1.69	6.92	
A-183	215353.968	2682598.093	Monitoring Well	Unconfined			--	7.18	--	--	4.61	4.61	11.79	
A-184	215355.106	2682611.410	Monitoring Well	Unconfined			--	5.36	--	--	4.98	4.98	10.34	
A-185	215506.571	2681565.569	Monitoring Well	Unconfined			--	8.90	--	--	1.18	1.18	10.08	
A-186	217107.287	2682887.932	Monitoring Well	Unconfined			--	5.05	--	--	5.49	5.49	10.54	
SW-3	215491.872	2681564.953	Monitoring Well	Unconfined			--	7.95	--	--	2.02	2.02	9.97	
A-45	215239.036	2682742.137	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	4.72	Same well as A-177 (one well in field is labeled with both designations on pvc pipe - map shows as two different wells, but only one actually present in field)
SWR-3	215359.059	2681810.735	Recovery Well - Inactive	Unconfined			--	7.44	--	--	3.17	3.17	10.61	
A-158	216131.910	2681604.367	Monitoring Well	Unconfined			--	3.22	--	--	2.92	2.92	6.14	
A-163	215985.240	2681069.787	Monitoring Well	Unconfined			--	6.72	--	--	3.77	3.77	10.49	
A-1	215288.956	2683608.072	Monitoring Well	Unconfined			--	4.46	--	--	2.39	2.39	6.85	
A-10	215427.902	2682406.215	Monitoring Well	Unconfined			--	3.45	--	--	4.83	4.83	8.28	
A-11	215380.325	2682015.508	Monitoring Well	Unconfined			--	5.03	--	--	2.74	2.74	7.77	
A-118	217109.272	2683070.537	RFI Monitoring Well	Unconfined			--	2.62	--	--	5.68	5.68	8.30	
A-12	215378.884	2682182.748	Monitoring Well	Unconfined			--	5.25	--	--	2.32	2.32	7.57	
A-122	215929.834	2682277.550	RFI Monitoring Well	Unconfined			--	4.62	--	--	2.82	2.82	7.44	
A-13	215611.001	2682674.376	Monitoring Well	Unconfined			--	--	--	--	NM	NM	8.48	Abandoned
A-133	215804.497	2681282.286	VI Monitoring Well	Unconfined			--	9.89	--	--	3.13	3.13	13.02	
A-134	215809.959	2681408.542	RFI Monitoring Well	Unconfined			--	7.94	--	--	1.20	1.20	9.14	
A-135	215822.935	2681633.451	RFI Monitoring Well	Unconfined			--	7.75	--	--	3.01	3.01	10.76	
A-136	215556.216	2681692.562	RFI Monitoring Well	Unconfined	0.9767	Characterization Results	7.05	7.37	0.32	1.65	1.33	1.64	8.70	
A-137	215161.003	2683597.259	VI Monitoring Well	Unconfined			--	6.65	--	--	1.98	1.98	8.63	
A-139	215985.030	2683731.800	Monitoring Well	Unconfined			--	4.43	--	--	4.69	4.69	9.12	
A-140	215636.991	2683699.414	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	9.89	
A-142	214931.260	2683675.641	Monitoring Well	Unconfined			--	5.80	--	--	2.76	2.76	8.56	
A-143	215553.453	2683339.643	Monitoring Well	Unconfined			--	5.79	--	--	3.71	3.71	9.50	

NOTES:
1. Elevation datum for wells within AOI 5 were surveyed to NAVD 88 as a part of this report. Survey completed by Langan as part of Work Plan and Site Characterization Activities.
2. Specific gravity (S.G.) values were determined from LNAPL samples collected by Aquaterra/Stantec as part of CCR and/or SCR/RIR.
3. For wells with no direct LNAPL density values, the density value in the nearest well with LNAPL data was used.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
5. Depth to water and depth to LNAPL provided by Stantec/Aquaterra.

0.01 foot Apparent LNAPL Thickness = Sheen or Film of Product on Groundwater.
AOI - Area of Interest
LNAPL - Light Non-Aqueous Phase Liquid
GW - Groundwater
ft - Feet
btic - BelowTop of Inner Casing
in - Inches
msl - Elevation Relative to Mean Sea Level
g/cc - Grams Per cubic centimeter
NM - Not Measured
VI - Vapor Intrusion

Table 3a
Summary of AOI 5 Groundwater and LNAPL Elevations July 2014
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Specific Gravity (g/cc) Used for GW Correction		Depth to Product (ft btic)	Depth to GW[5] (ft btic)	Apparent LNAPL Thickness (ft)	LNAPL Elevation (ft msl)	Groundwater Elevation (ft msl)	Corrected GW Elevation (ft msl)	TIC Elevation (ft. msl)	Notes
					S.G.[2]	Source[3]								
A-146	216551.974	2682962.216	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	10.88	Unable to Locate
A-147	216815.030	2682850.343	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	7.51	Unable to Locate
A-148	216806.086	2682640.918	Monitoring Well	Unconfined			--	2.80	--	--	5.21	5.21	8.01	
A-149	216327.389	2682442.660	Monitoring Well	Unconfined			--	3.18	--	--	5.31	5.31	8.49	
A-15	216313.742	2682689.425	Monitoring Well	Unconfined	0.9	S.G is an estimate. Fingerprinting should be completed to characterize LNAPL	0.92	0.99	0.07	4.19	4.12	4.18	5.11	
A-150	215611.769	2682502.234	Monitoring Well	Unconfined	0.9124	A-5	5.45	5.55	0.10	4.19	4.09	4.18	9.64	
A-151	215824.421	2682128.585	Monitoring Well	Unconfined			--	4.32	--	--	3.17	3.17	7.49	
A-152	216072.848	2681986.798	Monitoring Well	Unconfined			--	3.03	--	--	1.82	1.82	4.85	
A-153	217566.468	2683573.476	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	9.22	Unable to Locate
A-154	--	--	Monitoring Well	Unconfined			--	2.45	--	--	No TIC Elevation	No TIC Elevation	--	
A-155	216208.292	2681449.430	Monitoring Well	Unconfined			5.85	6.65	0.80	2.54	1.74	1.74	8.39	
A-156	216058.146	2681354.572	Monitoring Well	Unconfined	0.877	A-155	--	5.03	--	--	3.85	3.85	8.88	
A-157	216278.080	2681413.674	Monitoring Well	Unconfined			--	3.10	--	--	5.52	5.52	8.62	
A-161	215940.930	2681309.438	Monitoring Well	Unconfined	0.877	A-155	4.90	5.00	0.10	3.39	3.29	3.38	8.29	
A-162	215828.703	2681275.126	Monitoring Well	Unconfined			--	4.40	--	--	3.01	3.01	7.41	
A-164	216038.682	2681178.212	Monitoring Well	Unconfined			--	5.45	--	--	3.46	3.46	8.91	
A-166	215789.991	2681273.490	Monitoring Well	Unconfined	0.925	A-136, Environment Canda Database (Residual Fuel Oil #4)	8.00	8.15	0.15	3.31	3.16	3.30	11.31	
A-167	216200.322	2681257.275	Monitoring Well	Unconfined			--	4.68	--	--	4.78	4.78	9.46	
A-168	216443.844	2681699.054	Monitoring Well	Unconfined			--	8.04	--	--	2.65	2.65	10.69	
A-16	216996.268	2682671.491	Monitoring Well	Unconfined			--	3.52	--	--	5.50	5.50	9.02	
A-17	216877.402	2683572.924	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	8.40	Unable to Locate
A-21	215629.744	2681388.358	Monitoring Well	Unconfined	0.9356	A-22	2.75	NM	--	5.41	NM	NM	8.16	
A-22	216031.531	2680996.159	Monitoring Well	Unconfined	0.9356	Characterization Results	6.18	6.25	0.07	1.77	1.70	1.77	7.95	
A-23	216384.931	2682142.800	Monitoring Well	Unconfined			--	3.55	--	--	2.76	2.76	6.31	
A-24	215977.199	2681515.230	Monitoring Well	Unconfined			--	2.96	--	--	2.57	2.57	5.53	
A-25	216982.319	2682468.225	Monitoring Well	Unconfined			--	4.65	--	--	4.15	4.15	8.80	
A-26	216793.002	2682167.311	Monitoring Well	Unconfined			--	5.45	--	--	3.20	3.20	8.65	
A-27	216591.729	2681846.470	Monitoring Well	Unconfined			--	6.94	--	--	3.07	3.07	10.01	
A-3	215784.549	2683411.637	Monitoring Well	Unconfined			--	4.65	--	--	3.59	3.59	8.24	
A-39	215042.061	2683669.345	Monitoring Well	Unconfined			--	2.43	--	--	5.25	5.25	7.68	
A-4	215000.611	2683519.767	Monitoring Well	Unconfined			--	3.18	--	--	2.86	2.86	6.04	
A-40	215200.651	2683591.853	Monitoring Well	Unconfined			--	6.61	--	--	2.02	2.02	8.63	
A-41	215097.421	2683534.984	Monitoring Well	Unconfined			--	3.72	--	--	1.91	1.91	5.63	
A-44	215461.963	2683121.490	Monitoring Well	Unconfined			--	6.37	--	--	3.64	3.64	10.01	
A-46	215347.166	2682463.884	Monitoring Well	Unconfined	0.9124	A-5	7.50	10.31	2.81	3.32	0.51	3.07	10.82	
A-47	215249.128	2682432.166	Monitoring Well	Unconfined			--	4.58	--	--	2.84	2.84	7.42	
A-48	215156.858	2682295.202	Monitoring Well	Unconfined			--	4.25	--	--	2.20	2.20	6.45	
A-49	215647.044	2682249.067	Monitoring Well	Unconfined			--	3.50	--	--	3.70	3.70	7.20	

NOTES:
1. Elevation datum for wells within AOI 5 were surveyed to NAVD 88 as a part of this report. Survey completed by Langan as part of Work Plan and Site Characterization Activities.
2. Specific gravity (S.G.) values were determined from LNAPL samples collected by Aquaterra/Stantec as part of CCR and/or SCR/RIR.
3. For wells with no direct LNAPL density values, the density value in the nearest well with LNAPL data was used.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
5. Depth to water and depth to LNAPL provided by Stantec/Aquaterra.

0.01 foot Apparent LNAPL Thickness = Sheen or Film of Product on Groundwater.
AOI - Area of Interest
LNAPL - Light Non-Aqueous Phase Liquid
GW - Groundwater
ft - Feet
btic - BelowTop of Inner Casing
in - Inches
msl - Elevation Relative to Mean Sea Level
g/cc - Grams Per cubic centimeter
NM - Not Measured

Table 3a
Summary of AOI 5 Groundwater and LNAPL Elevations July 2014
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Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Specific Gravity (g/cc) Used for GW Correction		Depth to Product (ft btic)	Depth to GW[5] (ft btic)	Apparent LNAPL Thickness (ft)	LNAPL Elevation (ft msl)	Groundwater Elevation (ft msl)	Corrected GW Elevation (ft msl)	TIC Elevation (ft. msl)	Notes
					S.G.[2]	Source[3]								
A-5	215250.570	2682619.590	Monitoring Well	Unconfined	0.9124	Characterization Results	4.85	5.48	0.63	0.72	0.09	0.66	5.57	
A-6	215267.871	2682954.070	Monitoring Well	Unconfined			--	2.61	--	--	4.13	4.13	6.74	
A-7	215287.154	2683087.249	Monitoring Well	Unconfined			--	2.97	--	--	3.94	3.94	6.91	
A-9	215096.126	2683089.052	Monitoring Well	Unconfined			--	2.74	--	--	3.06	3.06	5.80	
SW-1	215437.008	2681673.285	RFI Monitoring Well	Unconfined	0.91	SW-1	7.75	8.65	0.90	2.01	1.11	1.93	9.76	
SW-2	215458.201	2681632.848	RFI Monitoring Well	Unconfined			--	6.39	--	--	3.55	3.55	9.94	
SW-4	215533.919	2681486.195	RFI Monitoring Well	Unconfined	0.91	SW-4	5.40	5.46	0.06	1.75	1.69	1.74	7.15	
SW-5	215654.599	2681321.800	RFI Monitoring Well	Unconfined	0.9356	A-22	5.85	9.90	4.05	4.64	0.59	4.38	10.49	
SWR-1	215697.370	2681283.470	Recovery Well - Inactive	Unconfined			--	6.66	--	--	1.62	1.62	8.28	
SWR-2	215397.239	2681737.115	Recovery Well - Inactive	Unconfined			--	7.79	--	--	2.27	2.27	10.06	
WP-14	215243.362	2682198.607	Temporary Well Point	Unconfined			--	6.55	--	--	2.57	2.57	9.12	
WP16-3	216898.621	2682402.462	Temporary Well Point	Unconfined			--	8.10	--	--	2.97	2.97	11.07	
WP-8	215136.674	2682440.816	Monitoring Well Point	Unconfined			--	4.11	--	--	2.88	2.88	6.99	
WP-9	215223.177	2682225.999	Monitoring Well Point	Unconfined			--	4.45	--	--	4.31	4.31	8.76	
WP9-8	216376.530	2681391.260	Temporary Well Point	--	0.9072	WP9-8	5.67	7.31	1.64	3.20	1.56	3.05	8.87	
WP-A	215593.701	2681386.916	Temporary Well Point	Unconfined	0.9356	A-22	5.35	9.15	3.80	4.25	0.45	4.01	9.60	
WP-B	215667.228	2681310.505	Temporary Well Point	Unconfined	0.9356	A-22	7.51	7.65	0.14	2.57	2.43	2.56	10.08	
WP-C	215681.178	2681378.371	Temporary Well Point	Unconfined			--	NM	--	--	NM	NM	6.53	Unable to Locate
WP-D	215913.763	2681483.512	Temporary Well Point	Unconfined			--	5.81	--	--	2.45	2.45	8.26	
WP-E	215985.849	2681621.917	Temporary Well Point	Unconfined			--	4.90	--	--	2.45	2.45	7.35	

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3. For wells with no direct LNAPL density values, the density value in the nearest well with LNAPL data was used.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
5. Depth to water and depth to LNAPL provided by Stantec/Aquaterra.

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Monitoring Point ID	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Specific Gravity (g/cc) Used for GW Correction		Depth to Product (ft btic)	Depth to GW[5] (ft btic)	Apparent LNAPL Thickness (ft)	LNAPL Elevation[6] (ft amsl)	Groundwater Elevation (ft amsl)	Corrected GW Elevation (ft amsl)	TIC Elevation (ft. msl)	Notes
					S.G.[2]	Source[3]								
A-169	215952.842	2681149.425	Monitoring Well	Unconfined			--	5.55	--	--	3.07	3.07	8.62	
A-170	215866.761	2681810.857	Monitoring Well	Unconfined			--	4.04	--	--	0.51	0.51	4.55	
A-171	215555.327	2681590.443	Monitoring Well	Unconfined			sheen	6.86	--	--	0.73	0.73	7.59	
A-172	215440.922	2681779.717	Monitoring Well	Unconfined			--	5.30	--	--	1.03	1.03	6.33	
A-173	215220.763	2682837.220	Monitoring Well	Unconfined			--	3.45	--	--	1.11	1.11	4.56	
A-174	217149.006	2683052.551	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	10.94	Damaged. Bulldozer backed into well causing obstruction at approximately 3 feet below ground surface.
A-175	215245.157	2682663.584	Monitoring Well	Unconfined			--	4.35	--	--	0.40	0.40	4.75	
A-176	215259.851	2682693.871	Monitoring Well	Unconfined	0.9124	A-5	4.16	4.31	0.15	0.40	0.25	0.39	4.56	
A-177	215248.638	2682739.380	Monitoring Well	Unconfined			--	3.85	--	--	0.73	0.73	4.58	
A-178	215228.364	2682769.779	Monitoring Well	Unconfined	0.9124	A-5	3.57	4.45	0.88	1.02	0.14	0.94	4.59	
A-179	215289.455	2682824.020	Monitoring Well	Unconfined	0.9124	A-5	3.78	6.00	2.22	4.63	2.41	4.44	8.41	
A-180	215315.670	2682845.926	Monitoring Well	Unconfined	0.9124	A-5	3.37	3.44	0.07	3.34	3.27	3.33	6.71	
A-181	215193.272	2682443.584	Monitoring Well	Unconfined			--	3.84	--	--	2.76	2.76	6.60	
A-182	215082.884	2682579.928	Monitoring Well	Unconfined			--	5.21	--	--	1.71	1.71	6.92	
A-183	215353.968	2682598.093	Monitoring Well	Unconfined	0.9124	A-5	5.95	9.32	3.37	5.84	2.47	5.54	11.79	
A-184	215355.106	2682611.410	Monitoring Well	Unconfined	0.9124	A-5	6.45	6.75	0.30	3.89	3.59	3.86	10.34	
A-185	215506.571	2681565.569	Monitoring Well	Unconfined			--	9.37	--	--	0.71	0.71	10.08	
A-186	217107.287	2682887.932	Monitoring Well	Unconfined			--	5.50	--	--	5.04	5.04	10.54	
SW-3	215491.872	2681564.953	Monitoring Well	Unconfined			--	9.05	--	--	0.92	0.92	9.97	
A-45	215239.036	2682742.137	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	4.72	Same well as A-177 (one well in field is labeled with both designations on pvc pipe - map shows as two different wells, but only one actually present in field)
SWR-3	215359.059	2681810.735	Recovery Well - Inactive	Unconfined			--	8.05	--	--	2.56	2.56	10.61	
A-158	216131.910	2681604.367	Monitoring Well	Unconfined			--	4.50	--	--	1.64	1.64	6.14	
A-163	215985.240	2681069.787	Monitoring Well	Unconfined			--	7.13	--	--	3.36	3.36	10.49	
A-1	215288.956	2683608.072	Monitoring Well	Unconfined			--	5.21	--	--	1.64	1.64	6.85	
A-10	215427.902	2682406.215	Monitoring Well	Unconfined			--	4.29	--	--	3.99	3.99	8.28	
A-11	215380.325	2682015.508	Monitoring Well	Unconfined			--	5.61	--	--	2.16	2.16	7.77	
A-118	217109.272	2683070.537	RFI Monitoring Well	Unconfined			--	2.60	--	--	5.70	5.70	8.30	
A-12	215378.884	2682182.748	Monitoring Well	Unconfined			--	5.83	--	--	1.74	1.74	7.57	
A-122	215929.834	2682277.550	RFI Monitoring Well	Unconfined			--	5.27	--	--	2.17	2.17	7.44	
A-13	215611.001	2682674.376	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	8.48	Abandoned
A-133	215804.497	2681282.286	VI Monitoring Well	Unconfined			--	9.85	--	--	3.17	3.17	13.02	
A-134	215809.959	2681408.542	RFI Monitoring Well	Unconfined			--	8.21	--	--	0.93	0.93	9.14	
A-135	215822.935	2681633.451	RFI Monitoring Well	Unconfined			--	8.57	--	--	2.19	2.19	10.76	
A-136	215556.216	2681692.562	RFI Monitoring Well	Unconfined			--	8.18	--	--	0.52	0.52	8.70	
A-137	215161.003	2683597.259	VI Monitoring Well	Unconfined			--	7.03	--	--	1.60	1.60	8.63	
A-139	215985.030	2683731.800	Monitoring Well	Unconfined			--	5.80	--	--	3.32	3.32	9.12	
A-140	215636.991	2683699.414	Monitoring Well	Unconfined			--	6.80	--	--	3.09	3.09	9.89	
A-142	214931.260	2683675.641	Monitoring Well	Unconfined			--	7.64	--	--	0.92	0.92	8.56	
A-143	215553.453	2683339.643	Monitoring Well	Unconfined			--	7.96	--	--	1.54	1.54	9.50	

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					S.G.[2]	Source[3]								
A-146	216551.974	2682962.216	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	10.88	Unable to Locate
A-147	216815.030	2682850.343	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	7.51	Unable to Locate
A-148	216806.086	2682640.918	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	8.01	
A-149	216327.389	2682442.660	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	8.49	
A-15	216313.742	2682689.425	Monitoring Well	Unconfined			--	1.21	--	--	3.90	3.90	5.11	
A-150	215611.769	2682502.234	Monitoring Well	Unconfined			--	5.65	--	--	3.99	3.99	9.64	
A-151	215824.421	2682128.585	Monitoring Well	Unconfined			--	5.10	--	--	2.39	2.39	7.49	
A-152	216072.848	2681986.798	Monitoring Well	Unconfined			--	4.12	--	--	0.73	0.73	4.85	
A-153	217566.468	2683573.476	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	9.22	Unable to Locate
A-154	--	--	Monitoring Well	Unconfined			--	3.51	--	--	No TIC Elevation	No TIC Elevation	--	
A-155	216208.292	2681449.430	Monitoring Well	Unconfined			5.99	6.50	0.51	2.40	1.89	1.89	8.39	
A-156	216058.146	2681354.572	Monitoring Well	Unconfined			--	6.02	--	--	2.86	2.86	8.88	
A-157	216278.080	2681413.674	Monitoring Well	Unconfined			--	5.55	--	--	3.07	3.07	8.62	
A-161	215940.930	2681309.438	Monitoring Well	Unconfined	0.877	A-155	5.43	5.55	0.12	2.86	2.74	2.85	8.29	
A-162	215828.703	2681275.126	Monitoring Well	Unconfined			--	4.08	--	--	3.33	3.33	7.41	
A-164	216038.682	2681178.212	Monitoring Well	Unconfined			--	5.97	--	--	2.94	2.94	8.91	
A-166	215790.017	2681273.477	Monitoring Well	Unconfined	0.925	A-136, Environment Canda Database	7.87	8.10	0.23	3.44	3.21	3.43	11.31	
A-167	216200.322	2681257.275	Monitoring Well	Unconfined			--	5.61	--	--	3.85	3.85	9.46	
A-168	216443.844	2681699.054	Monitoring Well	Unconfined			--	7.40	--	--	3.29	3.29	10.69	
A-16	216996.268	2682671.491	Monitoring Well	Unconfined			--	3.95	--	--	5.07	5.07	9.02	
A-17	216877.402	2683572.924	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	8.40	Unable to Locate
A-21	215629.744	2681388.358	Monitoring Well	Unconfined	0.9356	A-22	2.45	2.50	0.05	5.71	5.66	5.71	8.16	
A-22	216031.531	2680996.159	Monitoring Well	Unconfined	0.9356	Characterization Results	6.44	6.45	0.01	1.51	1.50	1.51	7.95	
A-23	216384.931	2682142.800	Monitoring Well	Unconfined			--	4.21	--	--	2.10	2.10	6.31	
A-24	215977.199	2681515.230	Monitoring Well	Unconfined			--	3.20	--	--	2.33	2.33	5.53	
A-25	216982.319	2682468.225	Monitoring Well	Unconfined			--	5.20	--	--	3.60	3.60	8.80	
A-26	216793.002	2682167.311	Monitoring Well	Unconfined			--	5.70	--	--	2.95	2.95	8.65	
A-27	216591.729	2681846.470	Monitoring Well	Unconfined			--	4.27	--	--	5.74	5.74	10.01	
A-3	215784.549	2683411.637	Monitoring Well	Unconfined			--	6.95	--	--	1.29	1.29	8.24	
A-39	215042.061	2683669.345	Monitoring Well	Unconfined			--	3.21	--	--	4.47	4.47	7.68	
A-4	215000.611	2683519.767	Monitoring Well	Unconfined			--	4.21	--	--	1.83	1.83	6.04	
A-40	215200.651	2683591.853	Monitoring Well	Unconfined			--	6.98	--	--	1.65	1.65	8.63	
A-41	215097.421	2683534.984	Monitoring Well	Unconfined			--	4.10	--	--	1.53	1.53	5.63	
A-44	215461.963	2683121.490	Monitoring Well	Unconfined			--	8.36	--	--	1.65	1.65	10.01	
A-46	215347.166	2682463.884	Monitoring Well	Unconfined	0.9124	A-5	8.91	11.89	2.98	1.91	-1.07	1.65	10.82	
A-47	215249.128	2682432.166	Monitoring Well	Unconfined			--	6.12	--	--	1.30	1.30	7.42	
A-48	215156.858	2682295.202	Monitoring Well	Unconfined			--	4.40	--	--	2.05	2.05	6.45	
A-49	215647.044	2682249.067	Monitoring Well	Unconfined			--	NM	--	--	NM	NM	7.20	

NOTES:

1. Elevation datum for wells within AOI 5 were surveyed to NAVD 88 as a part of this report. Survey completed by Langan as part of Work Plan and Site Characterization Activities.
2. Specific gravity (S.G.) values were determined from LNAPL samples collected by Aquaterra/Stantec as part of CCR and/or SCR/RIR.
3. For wells with no direct LNAPL density values, the density value in the nearest well with LNAPL data was used.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
5. Depth to water and depth to LNAPL provided by Stantec/Aquaterra.

0.01 foot Apparent LNAPL Thickness = Sheen or Film of Product on Groundwater.
AOI - Area of Interest
LNAPL - Light Non-Aqueous Phase Liquid
GW - Groundwater
ft - Feet
btic - BelowTop of Inner Casing
in - Inches
msl - Elevation Relative to Mean Sea Level
g/cc - Grams Per cubic centimeter
NM - Not Measured

Table 3b
Summary of AOI 5 Groundwater and LNAPL Elevations October 2014
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Monitoring Point ID	Northing	Easting	Well Type	Hydrostratigraphic Unit[4]	Specific Gravity (g/cc) Used for GW Correction		Depth to Product (ft btic)	Depth to GW[5] (ft btic)	Apparent LNAPL Thickness (ft)	LNAPL Elevation[6] (ft amsl)	Groundwater Elevation (ft amsl)	Corrected GW Elevation (ft amsl)	TIC Elevation (ft. msl)	Notes
					S.G.[2]	Source[3]								
A-5	215279.332	2682614.581	Monitoring Well	Unconfined	0.9124	Characterization Results	5.05	5.10	0.05	0.52	0.47	0.51	5.57	
A-6	215267.871	2682954.070	Monitoring Well	Unconfined			–	3.98	–	–	2.76	2.76	6.74	
A-7	215287.154	2683087.249	Monitoring Well	Unconfined			3.68	3.72	0.04	3.23	3.19	3.19	6.91	
A-9	215096.126	2683089.052	Monitoring Well	Unconfined			–	3.51	–	–	2.29	2.29	5.80	
SW-1	215437.008	2681673.285	RFI Monitoring Well	Unconfined	0.91	SW-1	8.07	9.18	1.11	1.69	0.58	1.59	9.76	
SW-2	215458.201	2681632.848	RFI Monitoring Well	Unconfined			–	8.25	–	–	1.69	1.69	9.94	
SW-4	215533.919	2681486.195	RFI Monitoring Well	Unconfined	0.91	SW-4	6.05	6.10	0.05	1.10	1.05	1.10	7.15	
SW-5	215654.599	2681321.800	RFI Monitoring Well	Unconfined	0.9356	A-22	5.66	5.85	0.19	4.83	4.64	4.82	10.49	
SWR-1	215697.370	2681283.470	Recovery Well - Inactive	Unconfined			–	5.45	–	–	2.83	2.83	8.28	
SWR-2	215397.239	2681737.115	Recovery Well - Inactive	Unconfined			–	8.15	–	–	1.91	1.91	10.06	
WP-14	215243.362	2682198.607	Temporary Well Point	Unconfined			–	7.64	–	–	1.48	1.48	9.12	
WP16-3	216898.621	2682402.462	Temporary Well Point	Unconfined			–	8.69	–	–	2.38	2.38	11.07	
WP-8	215136.674	2682440.816	Monitoring Well Point	Unconfined			–	5.20	–	–	1.79	1.79	6.99	
WP-9	215236.361	2682346.451	Monitoring Well Point	Unconfined			–	5.59	–	–	3.17	3.17	8.76	
WP9-8	216376.530	2681391.260	Temporary Well Point	–	0.9072	WP9-8	5.30	7.10	1.80	3.57	1.77	3.40	8.87	
WP-A	215593.701	2681386.916	Temporary Well Point	Unconfined	0.9356	A-22	5.16	6.55	1.39	4.44	3.05	4.35	9.60	
WP-B	215667.228	2681310.505	Temporary Well Point	Unconfined	0.9356	A-22	7.31	7.54	0.23	2.77	2.54	2.76	10.08	
WP-C	215681.178	2681378.371	Temporary Well Point	Unconfined			–	NM	–	–	NM	NM	6.53	Unable to Locate
WP-D	215913.763	2681483.512	Temporary Well Point	Unconfined			–	6.10	–	–	2.16	2.16	8.26	
WP-E	215985.849	2681621.917	Temporary Well Point	Unconfined			–	5.00	–	–	2.35	2.35	7.35	

NOTES:
1. Elevation datum for wells within AOI 5 were surveyed to NAVD 88 as a part of this report. Survey completed by Langan as part of Work Plan and Site Characterization Activities.
2. Specific gravity (S.G.) values were determined from LNAPL samples collected by Aquaterra/Stantec as part of CCR and/or SCR/RIR.
3. For wells with no direct LNAPL density values, the density value in the nearest well with LNAPL data was used.
4. Hydrostratigraphic Unit based on the formation in which the well was screened in.
5. Depth to water and depth to LNAPL provided by Stantec/Aquaterra.

0.01 foot Apparent LNAPL Thickness = Sheen or Film of Product on Groundwater.
AOI - Area of Interest
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msl - Elevation Relative to Mean Sea Level
g/cc - Grams Per cubic centimeter
NM - Not Measured

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	A-139				A-140				A-142				A-143				A-151				A_152			
			Sample ID	A-139_071207_1.5-2.0				A-140_071207_1.5-2.0				A-142_1.5-2.0				A-143_0712_1.5-2.0				A-151_071207_1.5-2.0				A-152_071207_1.5-2.0			
			Sample Date	7/12/2007				7/12/2007				7/12/2007				7/12/2007				7/12/2007				7/12/2007			
			Sample Depth (ft bgs)	1.5-2				1.5-2				1.5-2				1.5-2				1.5-2				1.5-2			
			Unit	Result	Q	DL	DF	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	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		ND	U	0.0035		ND	U	0.0031	
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		0.036		0.0035		ND	U	0.0031	
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		ND	U	0.0035		ND	U	0.0031	
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		ND	U	0.0035		ND	U	0.0031	
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		ND	U	0.0035		ND	U	0.0031	
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		0.0056		0.0035		ND	U	0.0031	
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.011		ND	U	0.0075		NA				ND	U	0.0071		0.0086		0.007		ND	U	0.0063	
Semi-Volatile Organic Compounds																											
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	ND	U	0.85		5.1		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Benzo(A)Pyrene	50-32-8	12	mg/kg	ND	U	0.85		6.1		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.93		0.85		6.1		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	ND	U	0.85		ND	U	2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Chrysene	218-01-9	760	mg/kg	ND	U	0.85		5.2		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.85		ND	U	2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.0053		ND	U	0.0038		NA				ND	U	0.0035		ND	U	0.0035		ND	U	0.0031	
Phenanthrene	85-01-8	190,000	mg/kg	ND	U	0.85		7.2		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Pyrene	129-00-0	96,000	mg/kg	0.92		0.85		11		2		NA				ND	U	0.38		ND	U	1.9		ND	U	1.9	
Metals																											
Lead*	7439-92-1	2,240	mg/kg	191		0.61		**2460**		0.64		377		0.57		446		0.58		112		0.65		110		0.57	

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	A-140				A-141				A-144				A-150				A-153			
			Sample ID	A-140				A-141				A-144				A-150				A-153			
			Sample Date	4/6/2009				4/6/2009				4/6/2009				4/7/2009				4/8/2009			
			Sample Depth (ft bgs)	0.5-2				0.5-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	ND	U	0.33	54.23	ND	U	0.38	64.43
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	ND	U	0.33	54.23	ND	U	0.38	64.43
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	4.9		0.33	54.23	ND	U	0.38	64.43
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	3.3		0.33	54.23	ND	U	0.38	64.43
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	1.2		0.33	54.23	ND	U	0.38	64.43
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	ND	U	0.33	54.23	ND	U	0.38	64.43
Toluene	108-88-3	10,000	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	6.9		0.33	54.23	ND	U	0.38	64.43
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.24	42.81	ND	U	0.28	46.82	ND	U	0.27	40.72	12		0.33	54.23	0.43		0.38	64.43
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.87		0.19	1	0.38		0.2	1	ND	U	0.22	1	0.28		0.2	1	0.28		0.2	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	2.3		0.19	1	1		0.2	1	0.43		0.22	1	ND	U	0.2	1	0.75		0.2	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	1.9		0.19	1	0.95		0.2	1	0.56		0.22	1	ND	U	0.2	1	0.65		0.2	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	2.6		0.19	1	1.2		0.2	1	0.75		0.22	1	ND	U	0.2	1	0.99		0.2	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.1		0.19	1	0.66		0.2	1	0.45		0.22	1	ND	U	0.2	1	0.43		0.2	1
Chrysene	218-01-9	760	mg/kg	2.2		0.19	1	1.1		0.2	1	0.49		0.22	1	ND	U	0.2	1	0.77		0.2	1
Fluorene	86-73-7	130,000	mg/kg	0.42		0.19	1	ND	U	0.2	1	ND	U	0.22	1	0.34		0.2	1	ND	U	0.2	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.19	1	ND	U	0.2	1	ND	U	0.22	1	ND	U	0.2	1	0.28		0.2	1
Phenanthrene	85-01-8	190,000	mg/kg	3.8		0.19	1	1.5		0.2	1	0.53		0.22	1	0.33		0.2	1	1.3		0.2	1
Pyrene	129-00-0	96,000	mg/kg	3.9		0.19	1	1.8		0.2	1	0.52		0.22	1	0.33		0.2	1	1.1		0.2	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	316		1.14	10	660		2.4	20	156		1.28	10	190		1.19	10	37.4		1.14	10

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
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E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	A-155				A-156				A-159				A-160				A-161			
			Sample ID	A-155				A-156-2'				A-159_2'				A-160_2'				A-161-0-1'			
			Sample Date	4/7/2009				11/9/2012				11/1/2012				11/2/2012				11/9/2012			
			Sample Depth (ft bgs)	0-2				1-2				1-2				1-2				0-1			
			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	mg/kg	NA				ND	U	0.58	1	1.9		0.89	1	0.466	J	0.74	1	0.001	J	0.0068	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.26	43.71	ND	U	0.12	1	ND	U	0.36	1	ND	U	0.29	1	ND	U	0.0014	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.26	43.71	ND	U	0.12	1	ND	U	0.36	1	ND	U	0.29	1	ND	U	0.0014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				ND	U	0.58	1	2.74		0.89	1	ND	U	0.74	1	0.00053	J	0.0068	1
Benzene	71-43-2	290	mg/kg	0.52		0.26	43.71	0.228		0.12	1	0.266		0.089	1	0.273		0.074	1	0.00034	J	0.0014	1
Ethylbenzene	100-41-4	890	mg/kg	0.71		0.26	43.71	ND	U	0.12	1	0.538		0.36	1	0.464		0.29	1	ND	U	0.0014	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	7.2		0.26	43.71	6.63		0.58	1	1.27		0.89	1	2.84		0.74	1	0.0008	J	0.0068	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.26	43.71	ND	U	0.12	1	ND	U	0.36	1	ND	U	0.29	1	ND	U	0.0014	1
Toluene	108-88-3	10,000	mg/kg	1		0.26	43.71	0.267		0.12	1	0.951		0.89	1	0.46	J	0.74	1	0.00041	J	0.0014	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	2.3		0.26	43.71	0.662		0.12	1	2.35		0.36	1	1.3		0.29	1	0.00092	J	0.0014	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	5.7		2	10	0.279		0.033	1	ND	U	0.69	5	0.134		0.12	1	0.603		0.21	5
Benzo(A)Anthracene	56-55-3	130	mg/kg	3.5		2	10	0.589		0.033	1	0.618	J	0.69	5	0.1	J	0.12	1	0.627		0.21	5
Benzo(A)Pyrene	50-32-8	12	mg/kg	3.1		2	10	0.559		0.033	1	0.376	J	0.69	5	0.0764	J	0.12	1	2.39		0.21	5
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	3.2		2	10	0.53		0.033	1	0.783		0.69	5	0.118	J	0.12	1	1.82		0.21	5
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	ND	U	2	10	0.389		0.033	1	0.275	J	0.69	5	0.0597	J	0.12	1	1.95		0.21	5
Chrysene	218-01-9	760	mg/kg	4.8		2	10	0.69		0.033	1	0.871		0.69	5	0.108	J	0.12	1	3.85		0.21	5
Fluorene	86-73-7	130,000	mg/kg	19		2	10	0.365		0.033	1	ND	U	0.69	5	0.334		0.12	1	0.259		0.21	5
Naphthalene**	91-20-3	760	mg/kg	ND	U	2	10	NA				1.69		0.69	5	0.105	J	0.12	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	31		2	10	1.13		0.033	1	0.836		0.69	5	0.783		0.12	1	0.554		0.21	5
Pyrene	129-00-0	96,000	mg/kg	6.5		2	10	0.909		0.033	1	3.16		0.69	5	0.24		0.12	1	5.02		0.21	5
Metals																							
Lead*	7439-92-1	2,240	mg/kg	446		1.19	10	204		2.4	1	158		1.3	1	163		1.1	1	1380		2.7	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	A-169				A-170				A-171				A-172				A-173			
			Sample ID	PH-AOI5_A-169_0-2_06172014				A-170_0-2'				A-171_0-2'				PH-AOI5_A-172_0-2_06172014				A-173_0-2'			
			Sample Date	6/17/2014				6/24/2014				6/25/2014				6/17/2014				6/25/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	ND	U	0.002	1	ND	U	0.0019	1	ND	U	0.0021	1	0.647		0.29	1	0.00078	J	0.0026	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0029	1	ND	U	0.0027	1	ND	U	0.0033	1	ND	U	0.0036	1	ND	U	0.0032	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00099	1	ND	U	0.00096	1	ND	U	0.0011	1	ND	U	0.14	1	ND	U	0.0013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.002	1	ND	U	0.0019	1	ND	U	0.0021	1	0.189	J	0.29	1	0.00042	J	0.0026	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0005	1	ND	U	0.00048	1	ND	U	0.00053	1	0.237		0.072	1	ND	U	0.00065	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.00099	1	ND	U	0.00096	1	ND	U	0.0011	1	0.11	J	0.14	1	ND	U	0.0013	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.005	1	ND	U	0.0048	1	ND	U	0.0053	1	0.175	J	0.72	1	ND	U	0.0065	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00099	1	ND	U	0.00096	1	ND	U	0.0011	1	ND	U	0.14	1	ND	U	0.0013	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00099	1	ND	U	0.00096	1	ND	U	0.0011	1	1.04		0.14	1	ND	U	0.0013	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.00099	1	ND	U	0.00096	1	ND	U	0.0011	1	0.673		0.14	1	0.0008	J	0.0013	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0682		0.036	1	0.0875		0.035	1	0.412		0.042	1	0.0205	J	0.048	1	0.0346	J	0.041	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.129		0.036	1	0.59		0.035	1	0.476		0.042	1	0.0296	J	0.048	1	0.0552		0.041	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.164		0.036	1	0.653		0.035	1	0.46		0.042	1	0.0352	J	0.048	1	0.059		0.041	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.188		0.036	1	0.783		0.035	1	0.537		0.042	1	0.0408	J	0.048	1	0.0631		0.041	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.276		0.036	1	0.55		0.035	1	0.733		0.042	1	0.0383	J	0.048	1	0.0459		0.041	1
Chrysene	218-01-9	760	mg/kg	0.161		0.036	1	0.697		0.035	1	0.474		0.042	1	0.0738		0.048	1	0.0697		0.041	1
Fluorene	86-73-7	130,000	mg/kg	0.0223	J	0.036	1	0.0183	J	0.035	1	0.0338	J	0.042	1	0.06		0.048	1	0.055		0.041	1
Naphthalene**	91-20-3	760	mg/kg	0.0173	J	0.036	1	0.0178	J	0.035	1	0.125		0.042	1	0.0536		0.048	1	ND	U	0.041	1
Phenanthrene	85-01-8	190,000	mg/kg	0.179		0.036	1	0.337		0.035	1	0.271		0.042	1	0.0665		0.048	1	0.177		0.041	1
Pyrene	129-00-0	96,000	mg/kg	0.227		0.036	1	1.04		0.035	1	0.514		0.042	1	0.0473	J	0.048	1	0.0958		0.041	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	402		2	1	97.2		2.1	1	229		2.4	1	86		2	1	196		2.3	1

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	A-185				A-186				BH-04-07				BH-05-07				BH-06-07				BH-07-07			
			Sample ID	A-185_0-2'				A-186_0-2'				BH-04-07_1-2				BH-05-07_1-2				BH-06-07_0.5-1.0				BH-07-07_1-2			
			Sample Date	6/24/2014				6/27/2014				7/13/2007				7/12/2007				4/4/2007				7/13/2007			
			Sample Depth (ft bgs)	0-2				0-2				1-2				1-2				0.5-1				1-2			
			Unit	Result	Q	DL	DF	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	mg/kg	ND	U	0.0021	1	0.0014	J	0.003	1	NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0028	1	ND	U	0.0041	1	NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0021	1	0.00081	J	0.003	1	NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	ND	U	0.00052	1	ND	U	0.00075	1	NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0052	1	ND	U	0.0075	1	NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	NA				NA				NA				NA			
Semi-Volatile Organic Compounds																											
Anthracene	120-12-7	190,000	mg/kg	0.0739		0.037	1	0.505		0.055	1	NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.203		0.037	1	0.974		0.055	1	NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.266		0.037	1	1.03		0.055	1	NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.386		0.037	1	1.14		0.055	1	NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.25		0.037	1	0.756		0.055	1	NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	0.224		0.037	1	0.914		0.055	1	NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.037	1	0.205		0.055	1	NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.037	1	0.221		0.055	1	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.0651		0.037	1	1.49		0.055	1	NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	0.285		0.037	1	1.97		0.055	1	NA				NA				NA				NA			
Metals																											
Lead*	7439-92-1	2,240	mg/kg	92.2		2	1	37.1		3.3	1	203		0.58		316		0.78		373		0.63		1250		0.71	

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-08-07				BH-13-07				BH-18-07				BH-20-07				BH-21-07				BH-23-07			
			Sample ID	BH-08-07_.75-2				BH-13-07_0.5-1.0				BH-18-07_1.0-2.0				BH-20-07_0.75-2.0				BH-21-07_1.75-2				BH-23-07_0-0.5			
			Sample Date	7/13/2007				4/4/2007				4/4/2007				7/11/2007				4/4/2007				7/11/2007			
			Sample Depth (ft bgs)	0.75-2				0.5-1				1-2				0.75-2				1.75-2				0-0.5			
			Unit	Result	Q	DL	DF	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	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																											
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA				NA			
Metals																											
Lead*	7439-92-1	2,240	mg/kg	506		0.64		310		0.62		**3190**		0.99		21.7		0.58		26.7		0.59		1920		0.69	

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-24-07				BH-25-07				BH-26-07				BH-27-07				BH-01-09				BH-02-09			
			Sample ID	BH-24-07_1.5-2				BH-25-07_1-2				BH-26-07_1-2				BH-27-07_1.5-2.0				BH-01-09				BH-02-09			
			Sample Date	4/4/2004				7/11/2007				7/11/2007				7/12/2007				4/7/2009				4/7/2009			
			Sample Depth (ft bgs)	1.5-2				1-2				1-2				1.5-2				0-2				0-1.5			
			Unit	Result	Q	DL	DF	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	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																											
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA				NA			
Metals																											
Lead*	7439-92-1	2,240	mg/kg	152		0.64		103		0.6		41.7		0.56		**3700**		0.59		494		1.58	10	**17900**		68.7	500

Notes:
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ND - Not Detected
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ft bgs - feet below ground surface
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[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-03-09				BH-04-09				BH-05-09				BH-06-09				BH-07-09			
			Sample ID	BH-03-09				BH-04-09				BH-05-09				BH-06-09				BH-07-09			
			Sample Date	4/7/2009				4/7/2009				4/8/2009				4/8/2009				4/7/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	316		1.79	10	1810		8.17	50	449		1.38	10	407		1.32	10	748		2.43	20

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-08-09_AOI5				BH-09-09				BH-10-09				BH-11-09				BH-12-09			
			Sample ID	BH-08-09_AOI5				BH-09-09				BH-10-09				BH-11-09				BH-12-09			
			Sample Date	4/7/2009				4/7/2009				4/6/2009				4/7/2009				4/6/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	563		1.23	10	**2430**		13.7	100	441		1.16	10	613		2.36	20	806		2.46	20

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-13-09				BH-14-09				BH-15-09				BH-16-09				BH-17-09			
			Sample ID	BH-13-09				BH-14-09				BH-15-09				BH-16-09				BH-17-09			
			Sample Date	4/6/2009				4/6/2009				4/6/2009				4/6/2009				4/8/2009			
			Sample Depth (ft bgs)	1-2				1-2				0.5-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	298		1.11	10	285		1.2	10	323		1.13	10	2030		6.13	50	790		2.45	20

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-18-09				BH-19-09				BH-20-09				BH-21-09				BH-22-09			
			Sample ID	BH-18-09				BH-19-09				BH-20-09				BH-21-09				BH-22-09			
			Sample Date	4/8/2009				4/8/2009				4/8/2009				6/8/2009				6/8/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	327		1.46	10	228		1.28	10	453		1.35	10	1210		6.57	50	1780		13	100

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-23-09				BH-24-09				BH-25-09				BH-26-09				BH-33-09			
			Sample ID	BH-23-09				BH-24-09				BH-25-09				BH-26-09				BH-33-09			
			Sample Date	6/8/2009				6/8/2009				4/7/2009				4/7/2009				7/9/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				ND	U	0.36	51.23	ND	U	0.29	47.35	NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				0.42		0.23	1	ND	U	0.2	1	NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				0.79		0.23	1	ND	U	0.2	1	NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				0.81		0.23	1	ND	U	0.2	1	NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				1		0.23	1	ND	U	0.2	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				0.53		0.23	1	ND	U	0.2	1	NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				0.85		0.23	1	0.25		0.2	1	NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				0.34		0.23	1	ND	U	0.2	1	NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				0.25		0.23	1	ND	U	0.2	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				1.1		0.23	1	0.44		0.2	1	NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				1.3		0.23	1	0.27		0.2	1	NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1220		7.5	50	1100		6.17	50	1100		2.76	20	102		1.17	10	790		2.75	20

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-34-09				BH-35-09				BH-36-09				BH-37-09				BH-38-09			
			Sample ID	BH-34-09				BH-35-09				BH-36-09				BH-37-09				BH-38-09			
			Sample Date	7/9/2009				7/9/2009				7/9/2009				7/9/2009				7/9/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				NA			
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	485		1.4	10	772		2.62	20	374		1.46	10	1310		2.97	25	36.8		2.35	20

Notes:
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mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-39-09				BH-40-09				BH-41-09				BH-42-09				BH-43-09			
			Sample ID	BH-39-09				BH-40-09				BH-41-09				BH-42-09				BH-43-09			
			Sample Date	7/9/2009				7/9/2009				7/9/2009				7/9/2009				7/9/2009			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	NA				NA				NA				NA				ND	U	0.006	0.99
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA				NA			
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1050		2.29	20	219		1.06	10	387		1.08	10	183		1.1	10	NA			

Notes:
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NA - Not Analyzed
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH-44-09				BH-45-09				BH-46-09				AOI5 BH-14-12				AOI5 BH-17-12			
			Sample ID	BH-44-09				BH-45-09				BH-46-09				AOI5_BH-14-12				BH-17-12_.5-1			
			Sample Date	7/9/2009				7/9/2009				7/9/2009				3/18/2014				8/6/2012			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0.5-1			
			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	mg/kg	NA				NA				NA				ND	U	0.0047	1	ND	U	0.001	0.95
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				ND	U	0.0027	1	ND	U	0.001	0.95
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				ND	U	0.00094	1	ND	U	0.001	0.95
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				ND	U	0.0047	1	ND	U	0.001	0.95
Benzene	71-43-2	290	mg/kg	ND	U	0.29	51.55	ND	U	0.3	51.65	ND	U	0.006	0.96	ND	U	0.00094	1	0.002	J	0.0006	0.95
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				ND	U	0.00094	1	ND	U	0.001	0.95
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				ND	U	0.0047	1	0.001	J	0.001	0.95
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				ND	U	0.00094	1	ND	U	0.0006	0.95
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				ND	U	0.00094	1	0.002	J	0.001	0.95
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				ND	U	0.00094	1	ND	U	0.001	0.95
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				0.0485	J	0.062	2	0.026	J	0.012	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				0.175		0.062	2	0.17		0.012	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				0.181		0.062	2	0.19		0.012	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				0.235		0.062	2	0.29		0.012	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				0.143		0.062	2	0.14		0.012	1
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				0.221		0.062	2	0.23		0.012	1
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				ND	U	0.062	2	ND	U	0.012	1
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				ND	U	0.062	2	0.027	J	0.012	1
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				0.129		0.062	2	0.15		0.012	1
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				0.355		0.062	2	0.33		0.012	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	NA				NA				NA				99.9		2.2	1	158		0.0252	5

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-19-12				AOI5 BH-21-12				AOI5 BH-23-12				AOI5 BH-25-12				AOI5 BH-28-12			
			Sample ID	BH-19-12_.5-1				BH-21-12_.5-1				BH-23-12_.5-1				BH-25-12_.5-1				BH-28-12_0-.5			
			Sample Date	8/6/2012				8/6/2012				8/9/2012				8/8/2012				8/8/2012			
			Sample Depth (ft bgs)	0.5-1				0.5-1				0.5-1				0.5-1				0-0.5			
			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	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
Benzene	71-43-2	290	mg/kg	0.007		0.0006	0.86	0.002	J	0.0007	1.05	0.005	J	0.0006	0.91	ND	U	0.005	0.72	0.006	J	0.0008	0.95
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	ND	U	0.002	0.95
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0006	0.86	ND	U	0.0007	1.05	ND	U	0.0006	0.91	ND	U	0.005	0.72	ND	U	0.0008	0.95
Toluene	108-88-3	10,000	mg/kg	0.005	J	0.001	0.86	0.003	J	0.001	1.05	0.004	J	0.001	0.91	ND	U	0.005	0.72	0.016		0.002	0.95
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.001	0.86	ND	U	0.001	1.05	ND	U	0.001	0.91	ND	U	0.005	0.72	0.002	J	0.002	0.95
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.48		0.047	10	0.75		0.042	10	0.14		0.021	5	ND	U	0.38	5	0.14	J	0.08	5
Benzo(A)Anthracene	56-55-3	130	mg/kg	2		0.047	10	1.5		0.042	10	0.36		0.021	5	ND	U	0.38	5	0.32	J	0.08	5
Benzo(A)Pyrene	50-32-8	12	mg/kg	2.3		0.047	10	1.5		0.042	10	0.4		0.021	5	ND	U	0.38	5	0.43		0.08	5
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	2.6		0.047	10	1.6		0.042	10	0.53		0.021	5	ND	U	0.38	5	0.61		0.08	5
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.8		0.047	10	1.3		0.042	10	0.35		0.021	5	0.4		0.38	5	0.51		0.08	5
Chrysene	218-01-9	760	mg/kg	2.1		0.047	10	1.6		0.042	10	0.38		0.021	5	ND	U	0.38	5	0.4	J	0.08	5
Fluorene	86-73-7	130,000	mg/kg	0.16	J	0.047	10	0.25		0.042	10	0.045	J	0.021	5	ND	U	0.38	5	ND	U	0.08	5
Naphthalene**	91-20-3	760	mg/kg	1		0.047	10	3.3		0.042	10	0.53		0.021	5	0.57		0.38	5	0.47		0.08	5
Phenanthrene	85-01-8	190,000	mg/kg	2		0.047	10	1.6		0.042	10	0.44		0.021	5	ND	U	0.38	5	0.48		0.08	5
Pyrene	129-00-0	96,000	mg/kg	3.5		0.047	10	1.6		0.042	10	0.57		0.021	5	ND	U	0.38	5	0.49		0.08	5
Metals																							
Lead*	7439-92-1	2,240	mg/kg	876		0.119	20	121		0.0272	5	905		0.105	20	186		0.728	5	1760		0.349	50

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ft bgs - feet below ground surface
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[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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Table 4
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-32-12				AOI5 BH-33-12				AOI5 BH-34-12				AOI5 BH-36-12				AOI5 BH-40-12			
			Sample ID	BH-32-12_.5-1				BH-33-12_.5-1				BH-34-12_.5-1				BH-36-12_.5-1				BH-40-12_.5-1			
			Sample Date	8/8/2012				8/8/2012				8/7/2012				8/7/2012				8/7/2012			
			Sample Depth (ft bgs)	0.5-1				0.5-1				0.5-1				0.5-1				0.5-1			
			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	mg/kg	0.4	J	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.001	0.9
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.001	0.9
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.001	0.9
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.27	J	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.001	0.9
Benzene	71-43-2	290	mg/kg	ND	U	0.048	71.49	ND	U	0.0009	0.99	ND	U	0.005	0.86	0.015		0.005	0.75	0.011		0.0006	0.9
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.001	0.9
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.22	J	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	0.002	J	0.001	0.9
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.048	71.49	ND	U	0.0009	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	ND	U	0.0006	0.9
Toluene	108-88-3	10,000	mg/kg	ND	U	0.095	71.49	0.002	J	0.002	0.99	ND	U	0.005	0.86	0.005		0.005	0.75	0.005	J	0.001	0.9
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.095	71.49	ND	U	0.002	0.99	ND	U	0.005	0.86	ND	U	0.005	0.75	0.002	J	0.001	0.9
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	2.1		0.044	5	2.5		0.029	5	0.18		0.018	1	ND	U	0.21	10	0.25		0.042	10
Benzo(A)Anthracene	56-55-3	130	mg/kg	1.6		0.044	5	1.7		0.029	5	0.34		0.018	1	ND	U	0.21	10	0.78		0.042	10
Benzo(A)Pyrene	50-32-8	12	mg/kg	1.4		0.044	5	3.5		0.029	5	0.27		0.018	1	ND	U	0.21	10	0.79		0.042	10
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	1.3		0.044	5	3.8		0.029	5	0.31		0.018	1	0.22		0.21	10	1.1		0.042	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1		0.044	5	4.9		0.029	5	0.22		0.018	1	0.23		0.21	10	0.72		0.042	10
Chrysene	218-01-9	760	mg/kg	3.1		0.044	5	2.4		0.029	5	0.31		0.018	1	ND	U	0.21	10	0.89		0.042	10
Fluorene	86-73-7	130,000	mg/kg	3.5		0.044	5	1.1		0.029	5	0.026		0.018	1	ND	U	0.21	10	0.09	J	0.042	10
Naphthalene**	91-20-3	760	mg/kg	3		0.044	5	19		0.029	5	0.056		0.018	1	ND	U	0.21	10	0.47		0.042	10
Phenanthrene	85-01-8	190,000	mg/kg	9.3		0.044	5	3.8		0.029	5	0.69		0.018	1	ND	U	0.21	10	0.85		0.042	10
Pyrene	129-00-0	96,000	mg/kg	3.5		0.044	5	1.9		0.029	5	0.52		0.018	1	0.26		0.21	10	1.2		0.042	10
Metals																							
Lead*	7439-92-1	2,240	mg/kg	232		0.0293	5	545		0.0746	10	77.8		0.207	2	493		2.44	20	1360		0.276	50

Notes:
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PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-01				AOI5-BH-13-02				AOI5-BH-13-03				AOI5-BH-13-05				AOI5-BH-13-06			
			Sample ID	AOI5_BH-13-01_1.5-2_031213				A015-BH-13-02_0-.5				A015-BH-13-03_0-.5				A015-BH-13-05_0-.5				A015-BH-13-06_0-.25			
			Sample Date	3/12/2013				3/1/2013				3/1/2013				3/1/2013				3/1/2013			
			Sample Depth (ft bgs)	1.5-2				0-0.5				0-0.5				0-0.5				0-0.25			
			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	mg/kg	ND	U	0.0039	1	ND	U	0.0048	1	ND	U	0.0045	1	ND	U	0.0063	1	ND	U	0.0046	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0039	1	ND	U	0.0048	1	ND	U	0.0045	1	ND	U	0.0063	1	ND	U	0.0046	1
Benzene	71-43-2	290	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0039	1	ND	U	0.0048	1	ND	U	0.0045	1	ND	U	0.0063	1	ND	U	0.0046	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.00078	1	ND	U	0.00096	1	ND	U	0.0009	1	ND	U	0.0013	1	ND	U	0.00091	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0813		0.033	1	0.0282	J	0.043	1	0.0539		0.04	1	0.195		0.046	1	0.0298	J	0.039	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.2		0.033	1	0.182		0.043	1	0.0683		0.04	1	0.247		0.046	1	0.121		0.039	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.213		0.033	1	0.207		0.043	1	0.0791		0.04	1	0.303		0.046	1	0.143		0.039	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.273		0.033	1	0.264		0.043	1	0.168		0.04	1	0.363		0.046	1	0.179		0.039	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.191		0.033	1	0.26		0.043	1	0.112		0.04	1	0.391		0.046	1	0.127		0.039	1
Chrysene	218-01-9	760	mg/kg	0.216		0.033	1	0.184		0.043	1	0.114		0.04	1	0.308		0.046	1	0.139		0.039	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.033	1	ND	U	0.043	1	ND	U	0.04	1	ND	U	0.046	1	ND	U	0.039	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.033	1	ND	U	0.043	1	ND	U	0.04	1	0.0607		0.046	1	0.0187	J	0.039	1
Phenanthrene	85-01-8	190,000	mg/kg	0.192		0.033	1	0.0377	J	0.043	1	0.045		0.04	1	0.166		0.046	1	0.0862		0.039	1
Pyrene	129-00-0	96,000	mg/kg	0.264		0.033	1	0.188		0.043	1	0.124		0.04	1	0.309		0.046	1	0.171		0.039	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	331		2.4	1	137		2.6	1	168		2.4	1	1020		2.9	1	485		7.4	3

Notes:
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-08				AOI5-BH-13-11				AOI5-BH-13-13				AOI5_BH-13-15				AOI5_BH-13-16			
			Sample ID	AOI5_BH-13-08_1.5-2_031113				A015-BH-13-11_0-.25				A015-BH-13-13_0-.25				AOI5_BH-13-15_1.5-2_031113				AOI5_BH-13-16_1.5-2_031113			
			Sample Date	3/11/2013				3/1/2013				3/1/2013				3/11/2013				3/11/2013			
			Sample Depth (ft bgs)	1.5-2				0-0.25				0-0.25				1.5-2				1.5-2			
			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	mg/kg	ND	U	0.0044	1	ND	U	0.0051	1	ND	U	0.0045	1	ND	U	0.0045	1	ND	U	0.56	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	ND	U	0.11	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	ND	U	0.11	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0044	1	ND	U	0.0051	1	ND	U	0.0045	1	ND	U	0.0045	1	ND	U	0.56	1
Benzene	71-43-2	290	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	0.183		0.11	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	ND	U	0.11	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0044	1	ND	U	0.0051	1	ND	U	0.0045	1	ND	U	0.0045	1	ND	U	0.56	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	ND	U	0.11	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	0.366		0.11	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.00087	1	ND	U	0.001	1	ND	U	0.0009	1	ND	U	0.0009	1	0.294		0.11	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	ND	U	0.032	1	0.895		0.04	1	0.07		0.04	1	0.108		0.031	1	0.691		0.035	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	ND	U	0.032	1	3.47		0.04	1	0.377		0.04	1	0.242		0.031	1	2.15		0.035	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	ND	U	0.032	1	4.13		0.2	5	0.453		0.04	1	0.236		0.031	1	2.38		0.035	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	ND	U	0.032	1	4.63		0.2	5	0.537		0.04	1	0.272		0.031	1	2.51		0.035	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	ND	U	0.032	1	3.53		0.04	1	0.358		0.04	1	0.173		0.031	1	1.49		0.035	1
Chrysene	218-01-9	760	mg/kg	ND	U	0.032	1	3.41		0.04	1	0.443		0.04	1	0.236		0.031	1	2.12		0.035	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.032	1	0.178		0.04	1	0.0162	J	0.04	1	0.0418		0.031	1	0.224		0.035	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.032	1	0.0841		0.04	1	0.0212	J	0.04	1	ND	U	0.031	1	0.338		0.035	1
Phenanthrene	85-01-8	190,000	mg/kg	ND	U	0.032	1	3.4		0.04	1	0.282		0.04	1	0.367		0.031	1	1.49		0.035	1
Pyrene	129-00-0	96,000	mg/kg	ND	U	0.032	1	7.7		0.2	5	0.691		0.04	1	0.45		0.031	1	2.21		0.035	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	15.7		2.4	1	239		5.3	2	1310		2.4	1	28.6		2.3	1	349		2	1

Notes:
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**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-17				AOI5-BH-13-18				AOI5-BH-13-19				AOI5_BH-13-22				AOI5_BH-13-25			
			Sample ID	AOI5_BH-13-17_1.5-2_031113				A015-BH-13-18_0-.25				A015-BH-13-19_.5-1				AOI5_BH-13-22_1.5-2_030813				AOI5_BH-13-25_1.5-2_030813			
			Sample Date	3/11/2013				3/1/2013				3/1/2013				3/8/2013				3/8/2013			
			Sample Depth (ft bgs)	1.5-2				0-0.25				0.5-1				1.5-2				1-1.5			
			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	mg/kg	ND	U	0.0058	1	ND	U	0.0056	1	ND	U	0.0051	1	ND	U	0.0056	1	ND	U	0.54	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	ND	U	0.0011	1	ND	U	0.11	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	ND	U	0.0011	1	ND	U	0.11	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0058	1	ND	U	0.0056	1	ND	U	0.0051	1	ND	U	0.0056	1	ND	U	0.54	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	0.0012		0.0011	1	0.906		0.11	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	ND	U	0.0011	1	0.964		0.11	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0058	1	ND	U	0.0056	1	ND	U	0.0051	1	ND	U	0.0056	1	3.15		0.54	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	ND	U	0.0011	1	ND	U	0.11	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	0.0016		0.0011	1	0.953		0.11	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.001	1	ND	U	0.0011	1	2.02		0.11	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.127		0.034	1	0.0834		0.044	1	0.232		0.041	1	3.23		0.19	5	2.5		0.19	5
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.354		0.034	1	0.359		0.044	1	0.92		0.041	1	1.54		0.19	5	1.12		0.19	5
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.354		0.034	1	0.452		0.044	1	1.08		0.041	1	1.41		0.19	5	1.05		0.19	5
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.431		0.034	1	0.49		0.044	1	1.22		0.041	1	2.39		0.19	5	1.22		0.19	5
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.298		0.034	1	0.325		0.044	1	0.678		0.041	1	1.03		0.19	5	0.685		0.19	5
Chrysene	218-01-9	760	mg/kg	0.443		0.034	1	0.387		0.044	1	0.924		0.041	1	2.11		0.19	5	1.47		0.19	5
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.034	1	ND	U	0.044	1	ND	U	0.041	1	5.99		0.19	5	6.13		0.19	5
Naphthalene**	91-20-3	760	mg/kg	0.0656		0.034	1	0.0546		0.044	1	0.0809		0.041	1	ND	U	0.19	5	ND	U	0.19	5
Phenanthrene	85-01-8	190,000	mg/kg	0.363		0.034	1	0.16		0.044	1	0.235		0.041	1	10.1		0.19	5	12.1		0.19	5
Pyrene	129-00-0	96,000	mg/kg	0.492		0.034	1	0.389		0.044	1	ND	U	0.041	1	6.64		0.19	5	3.52		0.19	5
Metals																							
Lead*	7439-92-1	2,240	mg/kg	783		2.3	1	420		2.7	1	333		2.4	1	128		2.5	1	79.5		2.6	1

Notes:
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Table 4
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-26				AOI5-BH-13-27				AOI5_BH-13-28				AOI5_BH-13-29				AOI5_BH-13-30			
			Sample ID	AOI5_BH-13-26_1.5-2_030813				AOI5_BH-13-27_1.5-2_30713				AOI5_BH-13-28_1.5-2_30713				AOI5_BH-13-29_1-1.5_30613				AOI5_BH-13-30_1.5-2_30713			
			Sample Date	3/8/2013				3/7/2013				3/7/2013				3/6/2013				3/7/2013			
			Sample Depth (ft bgs)	1.5-2				1.5-2				1.5-2				1-1.5				1.5-2			
			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	mg/kg	ND	U	0.0048	1	ND	U	0.8	1	ND	U	0.006	1	ND	U	46	1	0.0107		0.0045	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	***9.3***	1	ND	U	0.0009	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	9.3	1	ND	U	0.0009	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0048	1	ND	U	0.8	1	ND	U	0.006	1	ND	U	46	1	0.006		0.0045	1
Benzene	71-43-2	290	mg/kg	ND	U	0.00097	1	12.4		0.16	1	0.0012		0.0012	1	ND	U	9.3	1	ND	U	0.0009	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	9.3	1	ND	U	0.0009	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0048	1	62.4		4	1	ND	U	0.006	1	**15500**		460	5	ND	U	0.0045	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	9.3	1	ND	U	0.0009	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	9.3	1	ND	U	0.0009	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.00097	1	ND	U	0.16	1	ND	U	0.0012	1	ND	U	9.3	1	0.0073		0.0009	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	1.13		0.042	1	0.318		0.045	1	12.6	E	0.041	1	0.199		0.052	1	0.403		0.074	2
Benzo(A)Anthracene	56-55-3	130	mg/kg	3.2		0.042	1	1.4		0.045	1	21.9	E	0.041	1	0.538		0.052	1	0.772		0.074	2
Benzo(A)Pyrene	50-32-8	12	mg/kg	3.05		0.042	1	1.48		0.045	1	**19.4**	E	0.041	1	0.426		0.052	1	0.708		0.074	2
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	3.85		0.042	1	1.29		0.045	1	26.9	E	0.041	1	0.597		0.052	1	0.563		0.074	2
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	2.02		0.042	1	1.53		0.045	1	12.7	E	0.041	1	0.293		0.052	1	0.622		0.074	2
Chrysene	218-01-9	760	mg/kg	3.31		0.042	1	1.54		0.045	1	20.6	E	0.041	1	0.548		0.052	1	0.776		0.074	2
Fluorene	86-73-7	130,000	mg/kg	0.48		0.042	1	0.107		0.045	1	6.4	E	0.041	1	0.168		0.052	1	0.235		0.074	2
Naphthalene**	91-20-3	760	mg/kg	0.426		0.042	1	0.125		0.045	1	0.96		0.041	1	ND	U	0.052	1	0.329		0.074	2
Phenanthrene	85-01-8	190,000	mg/kg	6.5		0.084	2	1.12		0.045	1	53.7	E	0.041	1	0.998		0.052	1	1.39		0.074	2
Pyrene	129-00-0	96,000	mg/kg	6.5		0.084	2	2.15		0.045	1	35.5	E	0.041	1	0.989		0.052	1	1.21		0.074	2
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1190		2.7	1	**2730**		4	2	1590		2	1	195		2	1	446		1.8	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-31				AOI5_BH-13-32				AOI5_BH-13-33				AOI5_BH-13-34				AOI5_BH-13-35			
			Sample ID	AOI5_BH-13-31_1.5-2_30613				AOI5_BH-13-32_1.5-2_30613				AOI5_BH-13-33_1.5-2_30713				AOI5_BH-13-34_1.5-2_30613				AOI5_BH-13-35_1.5-2_30613			
			Sample Date	3/6/2013				3/6/2013				3/7/2013				3/6/2013				3/6/2013			
			Sample Depth (ft bgs)	1.5-2				1.5-2				1.5-2				1.5-2				1.5-2			
			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	mg/kg	ND	U	0.005	1	ND	U	110	2.5	ND	U	0.37	1	ND	U	0.68	1	ND	U	0.006	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.001	1	ND	U	***21***	2.5	ND	U	0.073	1	ND	U	0.14	1	ND	U	0.0012	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.001	1	ND	U	21	2.5	ND	U	0.073	1	ND	U	0.14	1	ND	U	0.0012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.005	1	ND	U	110	2.5	ND	U	0.37	1	ND	U	0.68	1	ND	U	0.006	1
Benzene	71-43-2	290	mg/kg	0.0161		0.001	1	**1070**		21	2.5	ND	U	0.073	1	13.6		0.14	1	0.0512		0.0012	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.001	1	ND	U	21	2.5	ND	U	0.073	1	0.701		0.14	1	ND	U	0.0012	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.0093		0.005	1	9330		1100	25	ND	U	0.37	1	1650		170	2.5	ND	U	0.006	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.001	1	ND	U	21	2.5	ND	U	0.073	1	ND	U	0.14	1	ND	U	0.0012	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.001	1	ND	U	21	2.5	ND	U	0.073	1	ND	U	0.14	1	ND	U	0.0012	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.001	1	ND	U	21	2.5	0.0879		0.073	1	ND	U	0.14	1	ND	U	0.0012	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0522		0.043	1	0.653		0.044	1	0.281		0.039	1	0.309		0.04	1	0.358		0.039	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.137		0.043	1	1.99		0.044	1	0.858		0.039	1	1.24		0.04	1	0.851		0.039	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.127		0.043	1	1.88		0.044	1	0.876		0.039	1	1.4		0.04	1	0.198		0.039	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.16		0.043	1	2.45		0.044	1	0.993		0.039	1	1.33		0.04	1	0.823		0.039	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.129		0.043	1	1.29		0.044	1	0.783		0.039	1	0.933		0.04	1	0.287		0.039	1
Chrysene	218-01-9	760	mg/kg	0.159		0.043	1	2.13		0.044	1	0.925		0.039	1	1.32		0.04	1	1.17		0.039	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.043	1	0.451		0.044	1	0.526		0.039	1	0.209		0.04	1	0.504		0.039	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.043	1	1.64		0.044	1	0.14		0.039	1	0.186		0.04	1	0.212		0.039	1
Phenanthrene	85-01-8	190,000	mg/kg	0.145		0.043	1	3.33		0.044	1	1.43		0.039	1	1.37		0.04	1	6.19		0.19	5
Pyrene	129-00-0	96,000	mg/kg	0.221		0.043	1	3		0.044	1	1.45		0.039	1	1.53		0.04	1	2.32		0.039	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	365		1.9	1	2020		6	3	1090		2	1	851		2.1	1	1500		2	1

Notes:
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ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-36				AOI5_BH-13-37				AOI5_BH-13-38				AOI5_BH-13-39				AOI-5_BH-13-42			
			Sample ID	AOI5_BH-13-36_1.5-2_30613				AOI5_BH-13-37_1.5-2_030513				AOI5_BH-13-38_1.5-2_030513				AOI5_BH-13-39_1.5-2_030513				BH-13-42-1.5-2_030413			
			Sample Date	3/6/2013				3/5/2013				3/5/2013				3/5/2013				3/4/2013			
			Sample Depth (ft bgs)	1.5-2				1.5-2				1.5-2				1.5-2				1.5-2			
			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	mg/kg	ND	U	0.51	1	ND	U	0.0041	1	ND	U	0.0069	1	ND	U	0.0052	1	ND	U	0.0042	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.51	1	ND	U	0.0041	1	ND	U	0.0069	1	ND	U	0.0052	1	ND	U	0.0042	1
Benzene	71-43-2	290	mg/kg	2.62		0.1	1	0.0021		0.00081	1	ND	U	0.0014	1	0.00025	J	0.001	1	ND	U	0.00084	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	881		25	1	ND	U	0.0041	1	ND	U	0.0069	1	ND	U	0.0052	1	ND	U	0.0042	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.1	1	ND	U	0.00081	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.00084	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.161		0.076	2	0.0396		0.035	1	0.036	J	0.045	1	0.209		0.044	1	0.075		0.038	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.468		0.076	2	0.182		0.035	1	0.233		0.045	1	0.685		0.044	1	0.247		0.038	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.438		0.076	2	0.192		0.035	1	0.224		0.045	1	0.756		0.044	1	0.315		0.038	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.484		0.076	2	0.205		0.035	1	0.263		0.045	1	0.71		0.044	1	0.294		0.038	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.327		0.076	2	0.12		0.035	1	0.137		0.045	1	0.556		0.044	1	0.225		0.038	1
Chrysene	218-01-9	760	mg/kg	0.526		0.076	2	0.194		0.035	1	0.245		0.045	1	0.713		0.044	1	0.27		0.038	1
Fluorene	86-73-7	130,000	mg/kg	0.0949		0.076	2	0.0158	J	0.035	1	ND	U	0.045	1	0.0439	J	0.044	1	0.0164	J	0.038	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.076	2	0.0191	J	0.035	1	0.014	J	0.045	1	0.0511		0.044	1	0.0446		0.038	1
Phenanthrene	85-01-8	190,000	mg/kg	0.691		0.076	2	0.158		0.035	1	0.141		0.045	1	0.611		0.044	1	0.147		0.038	1
Pyrene	129-00-0	96,000	mg/kg	0.772		0.076	2	0.27		0.035	1	0.289		0.045	1	0.925		0.044	1	0.276		0.038	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	201		2	1	284		2.4	1	**3600**		7.9	3	1120		2.8	1	496		2.5	1

Notes:
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-43				AOI5_BH-13-44				AOI5_BH-13-116				AOI5_BH-13-117				AOI5_BH-13-121			
			Sample ID	BH-13-43-1.5-2_030513				AOI5_BH-13-44_1.5-2_030813				AOI-5_BH-13-116_0-.5_102913				AOI-5_BH-13-117_0-.5_102913				AOI-5_BH-13-121_102913_0-0.5			
			Sample Date	3/5/2013				3/8/2013				10/29/2013				10/29/2013				10/29/2013			
			Sample Depth (ft bgs)	1.5-2				1.5-2				0-0.5				0-0.5				0-0.5			
			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	mg/kg	ND	U	0.0048	1	ND	U	0.0044	1	ND	U	0.0074	1	ND	U	0.0066	1	ND	U	0.0054	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.004	1	ND	U	0.0037	1	ND	U	0.0034	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0048	1	ND	U	0.0044	1	ND	U	0.0074	1	ND	U	0.0066	1	ND	U	0.0054	1
Benzene	71-43-2	290	mg/kg	0.0004	J	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0048	1	0.0044		0.0044	1	ND	U	0.0074	1	ND	U	0.0066	1	ND	U	0.0054	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.00097	1	ND	U	0.00087	1	ND	U	0.0015	1	ND	U	0.0013	1	ND	U	0.0011	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.137		0.042	1	0.155		0.033	1	0.0795		0.054	1	0.195		0.049	1	0.111		0.044	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.617		0.042	1	0.592		0.033	1	0.392		0.054	1	1.01		0.049	1	0.544		0.044	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.799		0.042	1	0.696		0.033	1	0.534		0.054	1	0.991		0.049	1	0.631		0.044	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.91		0.042	1	0.937		0.033	1	0.684		0.054	1	1.16		0.049	1	0.822		0.044	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.719		0.042	1	0.66		0.033	1	0.433		0.054	1	0.641		0.049	1	0.436		0.044	1
Chrysene	218-01-9	760	mg/kg	0.695		0.042	1	0.599		0.033	1	0.608		0.054	1	1.35		0.049	1	0.717		0.044	1
Fluorene	86-73-7	130,000	mg/kg	0.0517		0.042	1	0.0341		0.033	1	ND	U	0.054	1	0.036	J	0.049	1	0.0413	J	0.044	1
Naphthalene**	91-20-3	760	mg/kg	0.109		0.042	1	0.0669		0.033	1	0.027	J	0.054	1	0.0232	J	0.049	1	0.0357	J	0.044	1
Phenanthrene	85-01-8	190,000	mg/kg	0.356		0.042	1	0.304		0.033	1	0.388		0.054	1	1.03		0.049	1	0.514		0.044	1
Pyrene	129-00-0	96,000	mg/kg	0.698		0.042	1	0.687		0.033	1	0.88		0.054	1	2.64		0.049	1	1		0.044	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1080		2.6	1	950		2.1	1	724		1.2	1	704		1.1	1	1160		1	1

Notes:
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PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-122				AOI5_BH-13-123				AOI5_BH-13-124				AOI5_BH-13-125				AOI5_BH-13-126			
			Sample ID	AOI-5_BH-13-122_0-.5_102913				AOI-5_BH-13-123_0-.5_102913				AOI-5_BH-13-124_0-.5_102913				AOI-5_BH-13-125_0-.5_102913				AOI-5_BH-13-126_0-0.5_102913			
			Sample Date	10/29/2013				10/29/2013				10/29/2013				10/29/2013				10/29/2013			
			Sample Depth (ft bgs)	0-0.5				0-0.5				0-0.5				0-0.5				0-0.5			
			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	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.013	1	ND	U	0.0074	1	ND	U	0.0041	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0053	1	ND	U	0.0043	1	ND	U	0.0043	1	ND	U	0.004	1	ND	U	0.0039	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.013	1	ND	U	0.0074	1	ND	U	0.0041	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.012	1	ND	U	0.011	1	ND	U	0.013	1	ND	U	0.0074	1	ND	U	0.0041	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0025	1	ND	U	0.0023	1	ND	U	0.0027	1	ND	U	0.0015	1	ND	U	0.00083	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.132		0.067	1	0.685		0.053	1	0.126		0.053	1	0.327		0.052	1	0.106		0.05	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.67		0.067	1	2.57		0.053	1	0.198		0.053	1	0.349		0.052	1	0.141		0.05	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.8		0.067	1	2.27		0.053	1	0.303		0.053	1	0.512		0.052	1	0.195		0.05	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	1.02		0.067	1	2.66		0.053	1	0.312		0.053	1	0.656		0.052	1	0.219		0.05	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.542		0.067	1	1.49		0.053	1	0.522		0.053	1	1.37		0.052	1	0.323		0.05	1
Chrysene	218-01-9	760	mg/kg	0.96		0.067	1	2.67		0.053	1	0.354		0.053	1	0.808		0.052	1	0.193		0.05	1
Fluorene	86-73-7	130,000	mg/kg	0.0456	J	0.067	1	0.0877		0.053	1	ND	U	0.053	1	0.0767		0.052	1	ND	U	0.05	1
Naphthalene**	91-20-3	760	mg/kg	0.031	J	0.067	1	0.0404	J	0.053	1	0.0675		0.053	1	0.0462	J	0.052	1	0.0253	J	0.05	1
Phenanthrene	85-01-8	190,000	mg/kg	0.764		0.067	1	1.83		0.053	1	0.165		0.053	1	0.32		0.052	1	0.103		0.05	1
Pyrene	129-00-0	96,000	mg/kg	1.42		0.067	1	4.31		0.053	1	0.324		0.053	1	0.717		0.052	1	0.186		0.05	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1450		1.7	1	1780		5.7	5	1350		1.2	1	**2890**		12	10	**2950**		12	10

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-127				AOI5_BH-13-128				AOI5_BH-13-129				AOI5_BH-13-130				AOI5_BH-13-131			
			Sample ID	AOI-5_BH-13-127-0-1_103013				AOI-5_BH-13-128-0-1_103013				AOI-5_BH-13-129-0-1_103013				AOI-5_BH-13-130_0-1_103013				AOI-5_BH-13-131_0-1_103013			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/30/2013				10/30/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-1				0-1			
			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	mg/kg	ND	U	0.0066	1	ND	U	0.0059	1	ND	U	0.0054	1	ND	U	0.0076	1	ND	U	0.0075	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0028	1	ND	U	0.0027	1	ND	U	0.0026	1	ND	U	0.0027	1	ND	U	0.0027	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0066	1	ND	U	0.0059	1	ND	U	0.0054	1	ND	U	0.0076	1	ND	U	0.0075	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0066	1	ND	U	0.0059	1	ND	U	0.0054	1	ND	U	0.0076	1	ND	U	0.0075	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0013	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0015	1	ND	U	0.0015	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0566		0.033	1	0.178		0.072	2	0.273		0.035	1	0.0788	J	0.16	5	0.0989		0.066	2
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.159		0.033	1	0.489		0.072	2	0.746		0.035	1	0.165		0.16	5	0.355		0.066	2
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.169		0.033	1	0.453		0.072	2	0.7		0.035	1	0.182		0.16	5	0.345		0.066	2
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.214		0.033	1	0.656		0.072	2	0.875		0.035	1	0.26		0.16	5	0.41		0.066	2
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.122		0.033	1	0.328		0.072	2	0.467		0.035	1	0.173		0.16	5	0.208		0.066	2
Chrysene	218-01-9	760	mg/kg	0.2		0.033	1	0.575		0.072	2	0.822		0.035	1	0.189		0.16	5	0.377		0.066	2
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.033	1	0.0609	J	0.072	2	0.0734		0.035	1	ND	U	0.16	5	ND	U	0.066	2
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.033	1	ND	U	0.072	2	0.0414		0.035	1	ND	U	0.16	5	ND	U	0.066	2
Phenanthrene	85-01-8	190,000	mg/kg	0.158		0.033	1	0.672		0.072	2	1.11		0.035	1	0.108	J	0.16	5	0.191		0.066	2
Pyrene	129-00-0	96,000	mg/kg	0.294		0.033	1	0.791		0.072	2	1.22		0.035	1	0.223		0.16	5	0.409		0.066	2
Metals																							
Lead*	7439-92-1	2,240	mg/kg	62.9		0.88	1	115		0.9	1	171		0.88	1	52.8		0.89	1	48.5		0.87	1

Notes:
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[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-132				AOI5_BH-13-133				AOI5_BH-13-134				AOI5_BH-13-135				AOI5_BH-13-136			
			Sample ID	AOI-5_BH-13-132_0-1_103013				AOI-5_BH-13-133_0-1_103013				AOI-5_BH-13-134_0-1_103013				AOI-5_BH-13-135-0-1_103013				AOI5-BH-13-136_103013_0-1			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/30/2013				10/30/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-1				0-1			
			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	mg/kg	ND	U	0.0061	1	ND	U	0.0055	1	ND	U	0.0062	1	ND	U	0.0061	1	ND	U	0.006	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0026	1	ND	U	0.0026	1	ND	U	0.0026	1	ND	U	0.0026	1	ND	U	0.0026	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0061	1	ND	U	0.0055	1	ND	U	0.0062	1	ND	U	0.0061	1	ND	U	0.006	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0061	1	ND	U	0.0055	1	ND	U	0.0062	1	ND	U	0.0061	1	ND	U	0.006	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0012	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	ND	U	0.16	5	0.0786		0.034	1	0.15		0.068	2	0.0862		0.034	1	0.0696	J	0.16	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.154	J	0.16	5	0.176		0.034	1	0.301		0.068	2	0.198		0.034	1	0.206		0.16	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.176		0.16	5	0.22		0.034	1	0.313		0.068	2	0.266		0.034	1	0.303		0.16	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.239		0.16	5	0.28		0.034	1	0.397		0.068	2	0.333		0.034	1	0.28		0.16	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.167		0.16	5	0.189		0.034	1	0.221		0.068	2	0.222		0.034	1	0.259		0.16	1
Chrysene	218-01-9	760	mg/kg	0.178		0.16	5	0.241		0.034	1	0.363		0.068	2	0.262		0.034	1	0.25		0.16	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.16	5	ND	U	0.034	1	ND	U	0.068	2	ND	U	0.034	1	ND	U	0.16	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.16	5	ND	U	0.034	1	0.0642	J	0.068	2	ND	U	0.034	1	ND	U	0.16	1
Phenanthrene	85-01-8	190,000	mg/kg	0.0959	J	0.16	5	0.129		0.034	1	0.508		0.068	2	0.242		0.034	1	0.101	J	0.16	1
Pyrene	129-00-0	96,000	mg/kg	0.197		0.16	5	0.273		0.034	1	0.49		0.068	2	0.343		0.034	1	0.401		0.16	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	47.6		0.86	1	74.8		0.84	1	55.2		0.9	1	60.9		0.83	1	53.4		0.9	1

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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-137				AOI5_BH-13-138				AOI5_BH-13-139				AOI5_BH-13-140				AOI5_BH-13-141			
			Sample ID	AOI5-BH-13-137_103013_0-1				AOI5-BH-13-138_103013_0-1				AOI5-BH-13-139_103013_0-1				AOI5-BH-13-140_103013_0-1				AOI5-BH-13-141_103013_0-1			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/30/2013				10/30/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-1				0-1			
			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	mg/kg	ND	U	0.0057	1	ND	U	0.0071	1	ND	U	0.0061	1	ND	U	0.0067	1	ND	U	0.0061	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0027	1	ND	U	0.0029	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0026	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0057	1	ND	U	0.0071	1	ND	U	0.0061	1	ND	U	0.0067	1	ND	U	0.0061	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0057	1	ND	U	0.0071	1	ND	U	0.0061	1	ND	U	0.0067	1	ND	U	0.0061	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0011	1	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0012	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.113	J	0.16	1	0.0873	J	0.19	1	0.214		0.16	1	ND	U	0.17	1	0.121	J	0.17	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.271		0.16	1	0.206		0.19	1	0.455		0.16	1	0.205		0.17	1	0.227		0.17	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.29		0.16	1	0.22		0.19	1	0.462		0.16	1	0.25		0.17	1	0.302		0.17	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.456		0.16	1	0.341		0.19	1	0.523		0.16	1	0.296		0.17	1	0.381		0.17	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.314		0.16	1	0.301		0.19	1	0.397		0.16	1	0.212		0.17	1	0.257		0.17	1
Chrysene	218-01-9	760	mg/kg	0.278		0.16	1	0.243		0.19	1	0.476		0.16	1	0.25		0.17	1	0.263		0.17	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.16	1	ND	U	0.19	1	0.145	J	0.16	1	ND	U	0.17	1	0.111	J	0.17	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.16	1	ND	U	0.19	1	ND	U	0.16	1	ND	U	0.17	1	ND	U	0.17	1
Phenanthrene	85-01-8	190,000	mg/kg	0.244		0.16	1	0.106	J	0.19	1	0.623		0.16	1	0.105	J	0.17	1	0.127	J	0.17	1
Pyrene	129-00-0	96,000	mg/kg	0.516		0.16	1	0.403		0.19	1	0.874		0.16	1	0.295		0.17	1	0.393		0.17	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	39.1		0.91	1	35.1		0.97	1	69.2		0.86	1	57.2		0.92	1	76.8		0.9	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-142				AOI5_BH-13-143				AOI5_BH-13-144				AOI5_BH-13-145				AOI5_BH-13-146			
			Sample ID	AOI5-BH-13-142_103013_0-1				AOI5-BH-13-143_103013_0-1				AOI5-BH-13-144_103013_0-1				AOI5-BH-13-145_103013_0-1				AOI5-BH-13-146_103013_0-1			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/30/2013				10/30/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-1				0-1			
			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	mg/kg	ND	U	0.0074	1	ND	U	0.006	1	ND	U	0.0056	1	ND	U	0.0059	1	ND	U	0.0074	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0028	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0026	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0074	1	ND	U	0.006	1	ND	U	0.0056	1	ND	U	0.0059	1	ND	U	0.0074	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0074	1	ND	U	0.006	1	ND	U	0.0056	1	ND	U	0.0059	1	ND	U	0.0074	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0015	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0841	J	0.18	1	0.109	J	0.17	1	0.071		0.035	1	0.133	J	0.18	1	0.256		0.17	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.271		0.18	1	0.269		0.17	1	0.209		0.035	1	0.317		0.18	1	0.585		0.17	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.414		0.18	1	0.347		0.17	1	0.256		0.035	1	0.402		0.18	1	0.725		0.17	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.348		0.18	1	0.439		0.17	1	0.324		0.035	1	0.509		0.18	1	0.765		0.17	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.337		0.18	1	0.269		0.17	1	0.293		0.035	1	0.405		0.18	1	0.607		0.17	1
Chrysene	218-01-9	760	mg/kg	0.264		0.18	1	0.31		0.17	1	0.252		0.035	1	0.417		0.18	1	0.719		0.17	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.18	1	ND	U	0.17	1	ND	U	0.035	1	ND	U	0.18	1	ND	U	0.17	1
Naphthalene**	91-20-3	760	mg/kg	0.0822	J	0.18	1	ND	U	0.17	1	0.0481		0.035	1	ND	U	0.18	1	ND	U	0.17	1
Phenanthrene	85-01-8	190,000	mg/kg	0.161	J	0.18	1	0.342		0.17	1	0.185		0.035	1	0.296		0.18	1	0.539		0.17	1
Pyrene	129-00-0	96,000	mg/kg	0.44		0.18	1	0.532		0.17	1	0.425		0.035	1	0.642		0.18	1	1.29		0.17	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	37.9		0.93	1	40.1		0.88	1	**4060**		8.9	10	80.4		0.92	1	49.4		0.84	1

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-147				AOI5_BH-13-148				AOI5_BH-13-149				AOI5_BH-13-149				AOI5_BH-13-150			
			Sample ID	AOI5-BH-13-147_103013_0-1				AOI5-BH-13-148_103013_0-1				AOI5-BH-13-149_103013_0-1				AOI5-BH-13-DUP-103013_0-1				AOI5-BH-13-150_103013_0-1			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/30/2013				10/30/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-1				0-1			
			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	mg/kg	ND	U	0.0057	1	ND	U	0.0061	1	ND	U	0.0063	1	ND	U	0.0056	1	ND	U	0.0082	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0029	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0057	1	ND	U	0.0061	1	ND	U	0.0063	1	ND	U	0.0056	1	ND	U	0.0082	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0057	1	ND	U	0.0061	1	ND	U	0.0063	1	ND	U	0.0056	1	ND	U	0.0082	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0011	1	ND	U	0.0012	1	ND	U	0.0013	1	ND	U	0.0011	1	ND	U	0.0016	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.112	J	0.17	1	0.0753	J	0.17	1	0.0401		0.034	1	0.041		0.035	1	0.293		0.038	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.25		0.17	1	0.203		0.17	1	0.117		0.034	1	0.122		0.035	1	1.08		0.038	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.323		0.17	1	0.288		0.17	1	0.144		0.034	1	0.147		0.035	1	1.14		0.038	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.376		0.17	1	0.313		0.17	1	0.168		0.034	1	0.169		0.035	1	1.39		0.038	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.232		0.17	1	0.233		0.17	1	0.13		0.034	1	0.151		0.035	1	0.762		0.038	1
Chrysene	218-01-9	760	mg/kg	0.302		0.17	1	0.231		0.17	1	0.147		0.034	1	0.159		0.035	1	1.23		0.038	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.17	1	ND	U	0.17	1	ND	U	0.034	1	ND	U	0.035	1	0.0827		0.038	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.17	1	ND	U	0.17	1	ND	U	0.034	1	ND	U	0.035	1	0.0517		0.038	1
Phenanthrene	85-01-8	190,000	mg/kg	0.151	J	0.17	1	0.137	J	0.17	1	0.104		0.034	1	0.0864		0.035	1	1.41		0.038	1
Pyrene	129-00-0	96,000	mg/kg	0.444		0.17	1	0.372		0.17	1	0.267		0.034	1	0.246		0.035	1	2.35		0.038	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	43.5		0.89	1	44.9		0.89	1	42.5		0.88	1	39.4		0.9	1	1750		4.8	5

Notes:
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DF - Dilution Factor
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NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-151				AOI5_BH-13-152				AOI5_BH-13-153				AOI5_BH-13-154				AOI5_BH-13-155			
			Sample ID	AOI5-BH-13-151_103013_0-1				AOI5-BH-13-152_103013_0-1				AOI5-BH-13-153_103013_0-1				AOI-5_BH-13-154_0-0.5_102913				AOI-5_BH-13-155_0-.5_102913			
			Sample Date	10/30/2013				10/30/2013				10/30/2013				10/29/2013				10/29/2013			
			Sample Depth (ft bgs)	0-1				0-1				0-1				0-0.5				0-0.5			
			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	mg/kg	ND	U	0.007	1	ND	U	0.0062	1	ND	U	0.006	1	ND	U	0.0075	1	ND	U	0.0062	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.003	1	ND	U	0.0031	1	ND	U	0.003	1	ND	U	0.0033	1	ND	U	0.003	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.007	1	ND	U	0.0062	1	ND	U	0.006	1	ND	U	0.0075	1	ND	U	0.0062	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.007	1	ND	U	0.0062	1	ND	U	0.006	1	ND	U	0.0075	1	ND	U	0.0062	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0014	1	ND	U	0.0012	1	ND	U	0.0012	1	ND	U	0.0015	1	ND	U	0.0012	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.161		0.076	2	0.393		0.039	1	0.352		0.038	1	0.128		0.043	1	0.19		0.039	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.81		0.076	2	1.25		0.039	1	1.8		0.038	1	0.497		0.043	1	0.68		0.039	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	1.03		0.076	2	1.25		0.039	1	1.74		0.038	1	0.574		0.043	1	0.781		0.039	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	1.31		0.076	2	1.52		0.039	1	2.27		0.038	1	0.768		0.043	1	1.02		0.039	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.68		0.076	2	0.838		0.039	1	1.08		0.038	1	0.477		0.043	1	0.664		0.039	1
Chrysene	218-01-9	760	mg/kg	1		0.076	2	1.29		0.039	1	2.2		0.038	1	0.617		0.043	1	0.833		0.039	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.076	2	0.112		0.039	1	0.0977		0.038	1	ND	U	0.043	1	0.0364	J	0.039	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.076	2	0.0368	J	0.039	1	0.0468		0.038	1	0.038	J	0.043	1	0.0585		0.039	1
Phenanthrene	85-01-8	190,000	mg/kg	0.565		0.076	2	1.45		0.039	1	1.48		0.038	1	0.406		0.043	1	0.52		0.039	1
Pyrene	129-00-0	96,000	mg/kg	1.5		0.076	2	2.58		0.039	1	3.45		0.038	1	0.784		0.043	1	1.04		0.039	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1020		1	1	**2290**		5	5	1270		0.99	1	1840		11	10	1690		9.7	10

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-156				AOI5_BH-13-158				AOI5_BH-13-159				AOI5_BH-14-01				AOI5_BH-14-02			
			Sample ID	AOI-5_BH-13-156_0-.5_102913				AOI-5_BH-13-158_0-1_102913				AOI-5_BH-13-159_0-1_102913				AOI5_BH-14-01				AOI5_BH-14-02			
			Sample Date	10/29/2013				10/29/2013				10/29/2013				3/17/2014				3/17/2014			
			Sample Depth (ft bgs)	0-0.5				0-1				0-1				0-2				0-2			
			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	mg/kg	ND	U	0.0076	1	ND	U	0.0072	1	ND	U	0.0052	1	ND	U	0.007	1	0.0013	J	0.0095	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0031	1	ND	U	0.0031	1	ND	U	0.003	1	ND	U	0.0036	1	ND	U	0.0035	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.0014	1	ND	U	0.0019	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0076	1	ND	U	0.0072	1	ND	U	0.0052	1	ND	U	0.007	1	ND	U	0.0095	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.0014	1	ND	U	0.0019	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.0014	1	ND	U	0.0019	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0076	1	ND	U	0.0072	1	ND	U	0.0052	1	ND	U	0.007	1	ND	U	0.0095	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.0014	1	ND	U	0.0019	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	0.00066	J	0.0014	1	ND	U	0.0019	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.001	1	ND	U	0.0014	1	ND	U	0.0019	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.134		0.041	1	0.583		0.037	1	0.0202	J	0.037	1	0.0623		0.047	1	0.0482		0.045	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.391		0.041	1	1.34		0.037	1	0.035	J	0.037	1	0.0408	J	0.047	1	0.198		0.045	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.467		0.041	1	1.33		0.037	1	0.0647		0.037	1	0.0621		0.047	1	0.24		0.045	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.633		0.041	1	1.68		0.037	1	0.0787		0.037	1	0.0608		0.047	1	0.287		0.045	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.424		0.041	1	0.989		0.037	1	0.0814		0.037	1	0.132		0.047	1	0.183		0.045	1
Chrysene	218-01-9	760	mg/kg	0.43		0.041	1	1.48		0.037	1	0.0427		0.037	1	0.0394	J	0.047	1	0.212		0.045	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.041	1	0.321		0.037	1	ND	U	0.037	1	ND	U	0.047	1	ND	U	0.045	1
Naphthalene**	91-20-3	760	mg/kg	0.0485		0.041	1	0.412		0.037	1	ND	U	0.037	1	0.025	J	0.047	1	ND	U	0.045	1
Phenanthrene	85-01-8	190,000	mg/kg	0.289		0.041	1	2.27		0.037	1	0.0198	J	0.037	1	0.0304	J	0.047	1	0.164		0.045	1
Pyrene	129-00-0	96,000	mg/kg	0.536		0.041	1	2.14		0.037	1	0.0377		0.037	1	ND	U	0.047	1	ND	U	0.045	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1350		0.98	1	1190		1	1	158		0.9	1	175		2	1	2130		5.8	3

Notes:
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[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
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10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-14-03				AOI5_BH-14-04				AOI5_BH-14-05				AOI5_BH-14-06				AOI5_BH-14-06			
			Sample ID	AOI5_BH-14-03				AOI5_BH-14-04				AOI5_BH-14-05				A015_BH-14-06				A015_BH-14-DUP1			
			Sample Date	3/17/2014				3/17/2014				3/18/2014				3/14/2014				3/14/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	ND	U	35	1	ND	U	0.46	1	ND	U	0.0057	1	NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0029	1	ND	U	0.0034	1	ND	U	0.0028	1	NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	7	1	ND	U	0.092	1	ND	U	0.0011	1	NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	35	1	ND	U	0.46	1	ND	U	0.0057	1	NA				NA			
Benzene	71-43-2	290	mg/kg	ND	U	7	1	56.7		0.92	1	ND	U	0.0011	1	ND	U	0.0017	1	ND	U	0.0017	1
Ethylbenzene	100-41-4	890	mg/kg	44.2		7	1	ND	U	0.092	1	ND	U	0.0011	1	ND	U	0.0017	1	ND	U	0.0017	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	**21100**		3500	100	15.1		0.46	1	ND	U	0.0057	1	NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	7	1	ND	U	0.092	1	ND	U	0.0011	1	NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	7	1	0.0199	J	0.092	1	ND	U	0.0011	1	ND	U	0.0017	1	ND	U	0.0017	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	7	1	ND	U	0.092	1	ND	U	0.0011	1	ND	U	0.0017	1	ND	U	0.0017	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0301	J	0.035	1	0.0475		0.042	1	0.0575		0.033	1	NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.13		0.035	1	0.166		0.042	1	0.214		0.033	1	NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.136		0.035	1	0.163		0.042	1	0.227		0.033	1	0.2		0.045	1	ND	U	0.23	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.168		0.035	1	0.21		0.042	1	0.289		0.033	1	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.103		0.035	1	0.122		0.042	1	0.2		0.033	1	NA				NA			
Chrysene	218-01-9	760	mg/kg	0.153		0.035	1	0.206		0.042	1	0.271		0.033	1	NA				NA			
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.035	1	0.0168	J	0.042	1	ND	U	0.033	1	NA				NA			
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.035	1	0.0414	J	0.042	1	ND	U	0.033	1	0.0259	J	0.045	1	ND	U	0.23	1
Phenanthrene	85-01-8	190,000	mg/kg	0.0849		0.035	1	0.155		0.042	1	0.151		0.033	1	0.119		0.045	1	ND	U	0.23	1
Pyrene	129-00-0	96,000	mg/kg	ND	U	0.035	1	ND	U	0.042	1	0.426		0.033	1	NA				NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	47.1		2.3	1	40.6		2	1	45.7		2.2	1	1570		6.1	3	1390		2	1

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-14-07				AOI5_BH-14-08				AOI5_BH-14-09				AOI5_BH-14-10				AOI5_BH-14-11			
			Sample ID	A015_BH-14-07				A015_BH-14-08				AOI5_BH-14-09				AOI5_BH-14-10				AOI5_BH-14-11			
			Sample Date	3/14/2014				3/14/2014				3/18/2014				3/18/2014				3/18/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	NA				NA				ND	U	0.0058	1	ND	U	0.0068	1	ND	U	0.0064	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				ND	U	0.0028	1	ND	U	0.0028	1	ND	U	0.0029	1
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				ND	U	0.0012	1	ND	U	0.0014	1	ND	U	0.0013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				ND	U	0.0058	1	ND	U	0.0068	1	ND	U	0.0064	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0019	1	ND	U	0.0019	1	ND	U	0.0012	1	ND	U	0.0014	1	0.00038	J	0.0013	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0019	1	ND	U	0.0019	1	ND	U	0.0012	1	ND	U	0.0014	1	ND	U	0.0013	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				ND	U	0.0058	1	ND	U	0.0068	1	ND	U	0.0064	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				ND	U	0.0012	1	ND	U	0.0014	1	ND	U	0.0013	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0019	1	ND	U	0.0019	1	ND	U	0.0012	1	ND	U	0.0014	1	ND	U	0.0013	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	0.0039		0.0019	1	ND	U	0.0019	1	ND	U	0.0012	1	ND	U	0.0014	1	ND	U	0.0013	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	NA				NA				0.0479	J	0.066	2	0.079		0.035	1	0.105		0.07	2
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				0.18		0.066	2	0.264		0.035	1	0.323		0.07	2
Benzo(A)Pyrene	50-32-8	12	mg/kg	ND	U	0.049	1	0.337		0.047	1	0.217		0.066	2	0.29		0.035	1	0.316		0.07	2
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				0.267		0.066	2	0.388		0.035	1	0.376		0.07	2
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				0.203		0.066	2	0.23		0.035	1	0.227		0.07	2
Chrysene	218-01-9	760	mg/kg	NA				NA				0.212		0.066	2	0.356		0.035	1	0.396		0.07	2
Fluorene	86-73-7	130,000	mg/kg	NA				NA				ND	U	0.066	2	0.0231	J	0.035	1	0.0316	J	0.07	2
Naphthalene**	91-20-3	760	mg/kg	0.0363	J	0.049	1	0.0628		0.047	1	ND	U	0.066	2	0.0162	J	0.035	1	ND	U	0.07	2
Phenanthrene	85-01-8	190,000	mg/kg	ND	U	0.049	1	0.183		0.047	1	0.1		0.066	2	0.283		0.035	1	0.444		0.07	2
Pyrene	129-00-0	96,000	mg/kg	NA				NA				0.327		0.066	2	0.538		0.035	1	0.712		0.07	2
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1800		6.1	3	1670		2	1	37.9		2.3	1	27.5		2.2	1	38.3		2.4	1

Notes:
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[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-14-13				AOI5-BH-14-14				AOI5-BH-14-15				AOI5-BH-14-17				AOI5-BH-14-18			
			Sample ID	AOI5_BH-14-13				AOI-5_14-14_0-2'				AOI-5_14-15_0-2'				AOI-5_14-17_0-2'				AOI-5_14-18_0-2'			
			Sample Date	3/18/2014				6/16/2014				6/16/2014				6/16/2014				6/16/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	ND	U	0.0053	1	0.0019	J	0.002	1	0.0007	J	0.002	1	0.0003	J	0.0027	1	ND□		0.0028	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0028	1	ND□		0.0027	1	ND□		0.003	1	ND□		0.0029	1	ND□		0.0029	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0011	1	ND□		0.001	1	ND□		0.001	1	ND□		0.0013	1	ND□		0.0014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0053	1	0.0014	JJ	0.002	1	0.00035	J	0.002	1	0.00034	J	0.0027	1	ND□		0.0028	1
Benzene	71-43-2	290	mg/kg	ND	U	0.0011	1	0.00043	J	0.00051	1	0.00043	J	0.0005	1	ND□		0.00067	1	ND□		0.0007	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0011	1	ND□		0.001	1	0.00033	J	0.001	1	ND□		0.0013	1	ND□		0.0014	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0053	1	0.00023	J	0.0051	1	0.00059	J	0.005	1	ND□		0.0067	1	ND□		0.007	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0011	1	ND□		0.001	1	0.00041	J	0.001	1	NDJ		0.0013	1	ND□		0.0014	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0011	1	0.0006	J	0.001	1	0.0006	JJ	0.001	1	ND□		0.0013	1	ND□		0.0014	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0011	1	0.0012		0.001	1	0.0022		0.001	1	0.00037	J	0.0013	1	ND□		0.0014	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0466		0.035	1	0.387		0.035	1	0.0659		0.038	1	0.26		0.034	1	0.0393		0.037	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.158		0.035	1	1.08		0.035	1	0.182		0.038	1	0.783		0.034	1	0.148		0.037	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.154		0.035	1	1.17		0.035	1	0.244		0.038	1	0.951		0.034	1	0.176		0.037	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.202		0.035	1	1.38		0.035	1	0.319		0.038	1	1.04		0.034	1	0.207		0.037	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.141		0.035	1	0.865		0.035	1	0.2		0.038	1	0.673		0.034	1	0.135		0.037	1
Chrysene	218-01-9	760	mg/kg	0.204		0.035	1	1.22		0.035	1	0.212		0.038	1	0.803		0.034	1	0.159		0.037	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.035	1	0.106		0.035	1	0.0233	JJ	0.038	1	0.0849		0.034	1	ND□		0.037	1
Naphthalene**	91-20-3	760	mg/kg	ND	U	0.035	1	0.0909		0.035	1	0.0422		0.038	1	0.0673		0.034	1	ND□		0.037	1
Phenanthrene	85-01-8	190,000	mg/kg	0.102		0.035	1	1.19		0.035	1	0.137		0.038	1	0.774		0.034	1	0.146		0.037	1
Pyrene	129-00-0	96,000	mg/kg	0.327		0.035	1	1.98		0.035	1	0.244		0.038	1	1.29		0.034	1	0.239		0.037	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	29.5		2.3	1	120		2.1	1	336		2	1	87.7		2	1	31		2	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH_14-19				BH_14-20				BH_14-21				BH_14-22				BH_14-24			
			Sample ID	AOI-5_BH_14-19_0-2'				AOI-5_BH_14-20				AOI-5_BH_14-21_0-2'				AOI-5_BH_14-22_0-2'				AOI-5_BH_14-24_0-2'			
			Sample Date	6/18/2014				6/20/2014				6/18/2014				6/18/2014				6/20/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	0.0011	J	0.0019	1	ND	U	0.0021	1	ND	U	0.0022	1	ND	U	0.0018	1	ND	U	0.003	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0051	1	ND	U	0.003	1	ND	U	0.0031	1	ND	U	0.003	1	ND	U	0.0032	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.00093	1	ND	U	0.0011	1	ND	U	0.0011	1	ND	U	0.0009	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.00075	J	0.0019	1	ND	U	0.0021	1	ND	U	0.0022	1	ND	U	0.0018	1	ND	U	0.003	1
Benzene	71-43-2	290	mg/kg	0.0044		0.00047	1	ND	U	0.00054	1	0.0034		0.00055	1	0.00061		0.00045	1	0.00062	J	0.00075	1
Ethylbenzene	100-41-4	890	mg/kg	0.00054	J	0.00093	1	ND	U	0.0011	1	ND	U	0.0011	1	ND	U	0.0009	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0047	1	ND	U	0.0054	1	ND	U	0.0055	1	ND	U	0.0045	1	ND	U	0.0075	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.00093	1	ND	U	0.0011	1	ND	U	0.0011	1	ND	U	0.0009	1	ND	U	0.0015	1
Toluene	108-88-3	10,000	mg/kg	0.00053	J	0.00093	1	ND	U	0.0011	1	ND	U	0.0011	1	ND	U	0.0009	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	0.0082		0.00093	1	ND	U	0.0011	1	ND	U	0.0011	1	0.00023	J	0.0009	1	ND	U	0.0015	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.0334		0.033	1	0.142		0.039	1	0.671		0.039	1	0.163		0.037	1	0.0179	J	0.043	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.0933		0.033	1	0.422		0.039	1	0.914		0.039	1	0.352		0.037	1	0.0983		0.043	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.102		0.033	1	0.578		0.039	1	0.932		0.039	1	0.303		0.037	1	0.122		0.043	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.0952		0.033	1	0.644		0.039	1	1		0.039	1	0.301		0.037	1	0.167		0.043	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.096		0.033	1	0.449		0.039	1	0.513		0.039	1	0.272		0.037	1	0.113		0.043	1
Chrysene	218-01-9	760	mg/kg	0.118		0.033	1	0.438		0.039	1	1.98		0.039	1	0.449		0.037	1	0.106		0.043	1
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.033	1	0.023	J	0.039	1	0.903		0.039	1	0.0904		0.037	1	ND	U	0.043	1
Naphthalene**	91-20-3	760	mg/kg	0.0208	J	0.033	1	0.161		0.039	1	0.145		0.039	1	0.0347	J	0.037	1	ND	U	0.043	1
Phenanthrene	85-01-8	190,000	mg/kg	0.0492		0.033	1	0.187		0.039	1	2.34		0.039	1	0.319		0.037	1	0.0447		0.043	1
Pyrene	129-00-0	96,000	mg/kg	0.11		0.033	1	0.443		0.039	1	2.65		0.039	1	0.527		0.037	1	0.0956		0.043	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	70		1.9	1	168		2.1	1	394		1.9	1	441		1.9	1	641		4	2

Notes:
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ND - Not Detected
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ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH_14-25				BH_14-26				BH_14-27				BH_14-28				BH_14-29			
			Sample ID	AOI-5_BH_14-25_0-2'				AOI-5_BH_14-26_0-2'				AOI-5_BH_14-27_0-2'				AOI-5_BH_14-28_0-2'				AOI-5_BH_14-29_0-2'			
			Sample Date	6/18/2014				6/19/2014				6/19/2014				6/19/2014				6/19/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	0.0036		0.0034	1	ND	U	0.0031	1	ND	U	0.0023	1	ND	U	0.0017	1	ND	U	0.0031	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0042	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.0027	1	ND	U	0.003	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0017	1	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.00086	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.00069	J	0.0034	1	ND	U	0.0031	1	ND	U	0.0023	1	ND	U	0.0017	1	ND	U	0.0031	1
Benzene	71-43-2	290	mg/kg	0.006		0.00084	1	ND	U	0.00077	1	ND	U	0.00059	1	1.76		0.057	1	0.0337		0.00077	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0017	1	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.00086	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.00058	J	0.0084	1	ND	U	0.0077	1	ND	U	0.0059	1	ND	U	0.0043	1	0.0008	J	0.0077	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0017	1	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.00086	1	ND	U	0.0015	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0017	1	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.00086	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0017	1	ND	U	0.0015	1	ND	U	0.0012	1	ND	U	0.00086	1	ND	U	0.0015	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.659		0.053	1	0.0562	J	0.071	2	0.0481	J	0.073	2	0.0565		0.036	1	0.424		0.04	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	1.47		0.053	1	0.176		0.071	2	0.145		0.073	2	0.227		0.036	1	1.54		0.04	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	1.29		0.053	1	0.207		0.071	2	0.173		0.073	2	0.241		0.036	1	1.71		0.04	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	1.28		0.053	1	0.268		0.071	2	0.229		0.073	2	0.319		0.036	1	2.13		0.04	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.983		0.053	1	0.176		0.071	2	0.151		0.073	2	0.183		0.036	1	1.34		0.04	1
Chrysene	218-01-9	760	mg/kg	2.16		0.053	1	0.205		0.071	2	0.207		0.073	2	0.275		0.036	1	1.71		0.04	1
Fluorene	86-73-7	130,000	mg/kg	0.519		0.053	1	ND	U	0.071	2	ND	U	0.073	2	ND	U	0.036	1	0.117		0.04	1
Naphthalene**	91-20-3	760	mg/kg	0.149		0.053	1	ND	U	0.071	2	ND	U	0.073	2	ND	U	0.036	1	0.0902		0.04	1
Phenanthrene	85-01-8	190,000	mg/kg	3.67		0.053	1	0.109		0.071	2	0.121		0.073	2	0.178		0.036	1	1.72		0.04	1
Pyrene	129-00-0	96,000	mg/kg	3.02		0.053	1	0.289		0.071	2	0.236		0.073	2	0.388		0.036	1	2.54		0.04	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	1200		4.1	2	51.2		1.9	1	60.7		1.9	1	153		1.9	1	1330		2.4	1

Notes:
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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U - The compound was analyzed but not detected
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E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH_14-30				BH_14-31				BH_14-32				BH_14-33				BH_14-34			
			Sample ID	AOI-5_BH_14-30_0-2'				AOI-5_BH_14-31_0-2'				AOI-5-BH_14-32_0-2'				AOI-5-BH_14-33_0-2'				AOI-5-BH_14-34_0-2'			
			Sample Date	6/19/2014				6/19/2014				6/17/2014				6/17/2014				6/17/2014			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0-2			
			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	mg/kg	ND	U	0.0021	1	ND	U	0.003	1	ND	U	0.0028	1	0.133	J	0.32	1	0.262		0.2	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0029	1	ND	U	0.007	1	ND	U	0.0029	1	ND	U	0.003	1	ND	U	0.003	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.16	1	ND	U	0.1	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0021	1	ND	U	0.003	1	ND	U	0.0028	1	0.0497	J	0.32	1	0.0746	J	0.2	1
Benzene	71-43-2	290	mg/kg	3.13		0.068	1	0.125		0.00076	1	ND	U	0.00071	1	0.127		0.08	1	0.348		0.05	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	ND	U	0.0014	1	0.0978	J	0.16	1	0.267		0.1	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.00027	J	0.0052	1	ND	U	0.0076	1	ND	U	0.0071	1	59.5		4	1	39.2		2.5	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	ND	U	0.0014	1	ND	U	0.16	1	ND	U	0.1	1
Toluene	108-88-3	10,000	mg/kg	0.0019		0.001	1	ND	U	0.0015	1	ND	U	0.0014	1	0.128	J	0.16	1	0.396		0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.001	1	ND	U	0.0015	1	ND	U	0.0014	1	0.389		0.16	1	0.837		0.1	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.1		0.076	2	0.483		0.047	1	0.104		0.038	1	3.04		0.037	1	4.6		0.39	1
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.294		0.076	2	2.24		0.047	1	0.343		0.038	1	13.3		0.37	10	8.32		0.39	1
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.281		0.076	2	2.38		0.047	1	0.481		0.038	1	**12.5**		0.37	10	7.66		0.39	1
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.373		0.076	2	2.95		0.047	1	0.544		0.038	1	16.2		0.37	10	9.66		0.39	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.227		0.076	2	1.62		0.047	1	0.317		0.038	1	3.57		0.037	1	3.83		0.39	1
Chrysene	218-01-9	760	mg/kg	0.374		0.076	2	2.23		0.047	1	0.362		0.038	1	14.5		0.37	10	8.93		0.39	1
Fluorene	86-73-7	130,000	mg/kg	0.0403	J	0.076	2	0.145		0.047	1	0.0359	J	0.038	1	2.67		0.037	1	5.09		0.39	1
Naphthalene**	91-20-3	760	mg/kg	0.06	J	0.076	2	0.0775		0.047	1	0.0849		0.038	1	0.555		0.037	1	2.18		0.39	1
Phenanthrene	85-01-8	190,000	mg/kg	0.337		0.076	2	2.1		0.047	1	0.489		0.038	1	31		0.37	10	28.3		0.39	1
Pyrene	129-00-0	96,000	mg/kg	0.597		0.076	2	3.31		0.047	1	0.453		0.038	1	25.6		0.37	10	17.3		0.39	1
Metals																							
Lead*	7439-92-1	2,240	mg/kg	350		2	1	1980		1.9	1	344		1.9	1	1520		2.1	1	1140		4.1	2

Notes:
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	BH_14-35				BH_14-36				BH_14-37				BH-14-38				GP1209-PP			
			Sample ID	AOI-5-BH_14-35_0-2'				AOI-5_BH_14-36_0-2'				AOI-5_BH_14-37_0-2'				BH-14-38_0-2'				GP1209-PP-0.5			
			Sample Date	6/17/2014				6/18/2014				6/19/2014				6/26/2014				1/23/2012			
			Sample Depth (ft bgs)	0-2				0-2				0-2				0-2				0.5-1			
			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	mg/kg	ND	U	0.0029	1	ND	U	0.0018	1	ND	U	0.0021	1	ND	U	0.002	1	ND	U	0.073	55.03
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.003	1	ND	U	0.0054	1	ND	U	0.0029	1	ND	U	0.0029	1	ND	U	0.073	55.03
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0014	1	ND	U	0.00088	1	ND	U	0.001	1	ND	U	0.001	1	ND	U	0.073	55.03
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0029	1	ND	U	0.0018	1	ND	U	0.0021	1	ND	U	0.002	1	ND	U	0.073	55.03
Benzene	71-43-2	290	mg/kg	ND	U	0.00071	1	0.0032		0.00044	1	0.0727		0.00052	1	ND	U	0.0005	1	2.2		0.036	55.03
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0014	1	ND	U	0.00088	1	ND	U	0.001	1	ND	U	0.001	1	ND	U	0.073	55.03
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0071	1	ND	U	0.0044	1	ND	U	0.0052	1	ND	U	0.005	1	4.1		0.073	55.03
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0014	1	ND	U	0.00088	1	ND	U	0.001	1	ND	U	0.001	1	ND	U	0.036	55.03
Toluene	108-88-3	10,000	mg/kg	0.00053	J	0.0014	1	ND	U	0.00088	1	ND	U	0.001	1	ND	U	0.001	1	ND	U	0.073	55.03
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0014	1	ND	U	0.00088	1	ND	U	0.001	1	ND	U	0.001	1	ND	U	0.073	55.03
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.592		0.037	1	0.227		0.032	1	0.503		0.038	1	0.0209	J	0.038	1	ND	U	0.0088	10
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.945		0.037	1	1.24		0.032	1	1.99		0.038	1	0.0298	J	0.038	1	0.016	J	0.0044	10
Benzo(A)Pyrene	50-32-8	12	mg/kg	1.31		0.037	1	1.13		0.032	1	2.94		0.038	1	0.0319	J	0.038	1	0.02		0.0044	10
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	1.58		0.037	1	1.25		0.032	1	3.11		0.038	1	0.0386		0.038	1	0.017		0.0035	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.854		0.037	1	0.591		0.032	1	1.7		0.038	1	0.0411		0.038	1	0.033	J	0.026	10
Chrysene	218-01-9	760	mg/kg	1.14		0.037	1	1.02		0.032	1	2.21		0.038	1	0.0316	J	0.038	1	ND	U	0.04	10
Fluorene	86-73-7	130,000	mg/kg	0.429		0.037	1	0.0171	J	0.032	1	0.129		0.038	1	ND	U	0.038	1	ND	U	0.044	10
Naphthalene**	91-20-3	760	mg/kg	1.2		0.037	1	0.0765		0.032	1	0.461		0.038	1	ND	U	0.038	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	1.52		0.037	1	0.19		0.032	1	0.84		0.038	1	0.0321	J	0.038	1	0.028	J	0.026	10
Pyrene	129-00-0	96,000	mg/kg	1.64		0.037	1	1.43		0.032	1	2.8		0.038	1	0.0447		0.038	1	0.049	J	0.044	10
Metals																							
Lead*	7439-92-1	2,240	mg/kg	376		2.1	1	37.9		1.9	1	181		2.3	1	222		4.1	1	22.2		0.29	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	GP1212-PP				GPBR_08212014_B17C				GPBR_08212014_B18C				GPBR_08212014_B19C				GPBR_08212014_B3			
			Sample ID	GP1212-PP-0.5				GPBR_017C_08-21-2014(PH3B)				GPBR_018C_08-21-2014(PH3B)				GPBR_019C_08-21-2014(PH3B)				GPBR_014G_08-21-2014(PH3B-3)			
			Sample Date	1/23/2012				8/21/2014				8/21/2014				8/21/2014				8/21/2014			
			Sample Depth (ft bgs)	0.5-1				1-2				1-2				1-2				1-2			
			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	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.005	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.0031	1
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.0025	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.005	1
Benzene	71-43-2	290	mg/kg	0.034		0.001	1.62	NA				NA				NA				ND	U	0.0012	1
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.0025	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.033		0.002	1.62	NA				NA				NA				ND	U	0.012	1
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.001	1.62	NA				NA				NA				ND	U	0.0025	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.0025	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.002	1.62	NA				NA				NA				ND	U	0.0025	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	190,000	mg/kg	0.042		0.0084	10	0.172		0.036	1	0.324		0.039	1	0.135		0.037	1	NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	0.16		0.0042	10	0.408		0.036	1	1.24		0.039	1	0.488		0.037	1	NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	0.17		0.0042	10	0.478		0.036	1	1.12		0.039	1	0.571		0.037	1	NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	0.14		0.0034	10	0.569		0.036	1	1.67		0.039	1	0.779		0.037	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.24		0.025	10	0.303		0.036	1	0.777		0.039	1	0.393		0.037	1	NA			
Chrysene	218-01-9	760	mg/kg	0.23		0.038	10	0.55		0.036	1	1.44		0.039	1	0.715		0.037	1	NA			
Fluorene	86-73-7	130,000	mg/kg	ND	U	0.042	10	0.063		0.036	1	0.0789		0.039	1	0.0308	J	0.037	1	NA			
Naphthalene**	91-20-3	760	mg/kg	NA				0.179		0.036	1	0.277		0.039	1	0.0607		0.037	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.16		0.025	10	0.357		0.036	1	1.26		0.039	1	0.485		0.037	1	NA			
Pyrene	129-00-0	96,000	mg/kg	0.26		0.042	10	0.835		0.036	1	2.07		0.039	1	1		0.037	1	NA			
Metals																							
Lead*	7439-92-1	2,240	mg/kg	110		0.267	1	380		2.3	1	1020		2.4	1	816		2.3	1	NA			

Notes:
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ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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E - Compound was over the calibration range
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Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	GPBR_08212014_B5				GPBR_08212014_B8				AOI5-16-1-0-2-021016				GP-1208-LINE-1				GP-1208-LINE-2				GP-1208-LINE-3			
			Sample ID	GPBR_015G_08-21-2014(PH3B-5)				GPBR_016G_08-21-2014(PH3B-8)				AOI5-16-1-0-2-021016				GP-1208-LINE-1				GP-1208-LINE-2				GP-1208-LINE-3			
			Sample Date	8/21/2014				8/21/2014				2/10/2016				5/30/2007				5/30/2007				5/30/2007			
			Sample Depth (ft bgs)	1-2				1-2				0-2				0-0.5				0-0.5				0-0.5			
			Unit	Result	Q	DL	DF	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	mg/kg	ND	U	0.0025	1	ND	U	0.0052	1	NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	ND	U	0.0029	1	ND	U	0.0029	1	NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	ND	U	0.0012	1	ND	U	0.0026	1	NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0025	1	ND	U	0.0052	1	NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	ND	U	0.00062	1	ND	U	0.0013	1	NA				2.4	D	0.21	50	1	D	0.19	50	0.75	D	0.17	50
Ethylbenzene	100-41-4	890	mg/kg	ND	U	0.0012	1	ND	U	0.0026	1	NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0062	1	ND	U	0.013	1	NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	ND	U	0.0012	1	ND	U	0.0026	1	NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0012	1	ND	U	0.0026	1	NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	ND	U	0.0012	1	ND	U	0.0026	1	NA				NA				NA				NA			
Semi-Volatile Organic Compounds																											
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				0.3		0.0073	1	NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA				NA				NA			
Metals																											
Lead*	7439-92-1	2,240	mg/kg	NA				NA				121		0.31	1	NA				NA				NA			

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
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DF - Dilution Factor
ND - Not Detected
NA - Not Analyzed
ft bgs - feet below ground surface
*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

Qualifiers:
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J - Estimated value. Result between method detection and reporting limits
E - Compound was over the calibration range
D- Indicates a dilution

Exceedance Summary:
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10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

Table 4
Summary of Surface Soil Sample Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Surface Soil Direct Contact MSC[1]	Location ID	GP-1208-LINE-4				GP-1208-LINE-5				GP-1208-LINE-6				GP-1208-LINE-7			
			Sample ID	GP-1208-LINE-4				GP-1208-LINE-5				GP-1208-LINE-6				GP-1208-LINE-7			
			Sample Date	5/30/2007				5/30/2007				5/30/2007				5/30/2007			
			Sample Depth (ft bgs)	0-0.5				0-0.5				0-0.5				0-0.5			
			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	mg/kg	NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	3.7	mg/kg	NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	86	mg/kg	NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA			
Benzene	71-43-2	290	mg/kg	0.93	D	0.23	50	ND	U,D	0.26	50	0.2	J,D	0.22	50	1.9	D	0.25	50
Ethylbenzene	100-41-4	890	mg/kg	NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	8,600	mg/kg	NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	8,000	mg/kg	NA				NA				NA				NA			
Semi-Volatile Organic Compounds																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	130	mg/kg	NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	12	mg/kg	NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	76	mg/kg	NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA			
Chrysene	218-01-9	760	mg/kg	NA				NA				NA				NA			
Fluorene	86-73-7	130,000	mg/kg	NA				NA				NA				NA			
Naphthalene**	91-20-3	760	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA			
Pyrene	129-00-0	96,000	mg/kg	NA				NA				NA				NA			
Metals																			
Lead*	7439-92-1	2,240	mg/kg	NA				NA				NA				NA			

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
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ND - Not Detected
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*Site Specific Standard for lead is 2,240 mg/kg

[1]PADEP Non-Residential Direct Contact MSC for surface soils (0-2 feet below ground surface) (last updated August 27, 2016).

**Naphthalene was analyzed either as a semi volatile organic compound (analytical method SW8270C SIM) or volatile organic compound (analytical method SW8260B or SW8021B). Naphthalene results are presented on this table as semi-volatile organic compounds. In the event that both methods were used for one sample, the lower of the two detection limits was used.

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D- Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC or the site-specific standard for lead.
10 DL exceeds the PADEP Non-Residential Surface Soil Direct Contact MSC

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

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	A-169				A-170				A-171				A-172			
			Sample ID	PH-AOI5_A-169_2-4_06172014				A-170_4-6'				A-171_4-6'				PH-AOI5_A-172_2-3_06172014			
			Sample Date	6/17/14				6/24/14				6/25/14				6/17/14			
			Sample Depth (ft bgs)	2-4				4-6				4-6				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.086	J	0.23	1	0.00054	J	0.0016	1	ND	U	0.0018	1	0.00079	J	0.0034	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0062	1	ND	U	0.0029	1	ND	U	0.003	1	ND	U	0.004	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.12	1	ND	U	0.00082	1	ND	U	0.00089	1	ND	U	0.0017	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.23	1	ND	U	0.0016	1	ND	U	0.0018	1	ND	U	0.0034	1
Benzene	71-43-2	330	mg/kg	0.0949		0.058	1	ND	U	0.00041	1	ND	U	0.00045	1	0.00052	J	0.00086	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.0864	J	0.12	1	0.00062	J	0.00082	1	ND	U	0.00089	1	0.00075	J	0.0017	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	17.3		0.58	1	0.0185		0.0041	1	ND	U	0.0045	1	0.0034	J	0.0086	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.12	1	ND	U	0.00082	1	ND	U	0.00089	1	ND	U	0.0017	1
Toluene	108-88-3	10,000	mg/kg	0.134		0.12	1	ND	U	0.00082	1	ND	U	0.00089	1	0.0012	J	0.0017	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.282		0.12	1	0.0014		0.00082	1	ND	U	0.00089	1	0.0033		0.0017	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.261		0.041	1	0.153		0.037	1	0.45		0.04	1	0.157		0.053	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.132		0.041	1	0.363		0.037	1	1.31		0.04	1	0.317		0.053	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.104		0.041	1	0.375		0.037	1	1.48		0.04	1	0.409		0.053	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.151		0.041	1	0.437		0.037	1	1.64		0.04	1	0.497		0.053	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.0456		0.041	1	0.497		0.037	1	0.905		0.04	1	0.306		0.053	1
Chrysene	218-01-9	190,000	mg/kg	0.357		0.041	1	0.388		0.037	1	1.25		0.04	1	0.367		0.053	1
Fluorene	86-73-7	190,000	mg/kg	5.41		0.16	4	0.108		0.037	1	ND	U	0.04	1	0.174		0.053	1
Naphthalene	91-20-3	190,000	mg/kg	ND	U	0.041	1	ND	U	0.037	1	0.187		0.04	1	0.253		0.053	1
Phenanthrene	85-01-8	190,000	mg/kg	2.72		0.041	1	0.491		0.037	1	0.874		0.04	1	0.457		0.053	1
Pyrene	129-00-0	190,000	mg/kg	0.359		0.041	1	0.696		0.037	1	1.94		0.04	1	0.318		0.053	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	148		2.4	1	61.8		2	1	37.3		2.2	1	170		2	1

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	A-173				A-185				A-186				AOI5 BH-01-12			
			Sample ID	A-173_4-6'				A-185_6-8'				A-186_4-6'				BH-01-12_2-2.5			
			Sample Date	6/25/14				6/24/14				6/27/14				8/8/12			
			Sample Depth (ft bgs)	4-6				6-8				4-6				2-2.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.0006	J	0.0025	1	ND	U	0.0028	1	ND	U	0.0021	1	0.75		0.06	49.09
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0034	1	ND	U	0.0033	1	ND	U	0.0031	1	ND	U	0.06	49.09
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0013	1	ND	U	0.0014	1	ND	U	0.0011	1	ND	U	0.06	49.09
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0025	1	ND	U	0.0028	1	ND	U	0.0021	1	0.34		0.06	49.09
Benzene	71-43-2	330	mg/kg	ND	U	0.00063	1	0.0017		0.00069	1	ND	U	0.00053	1	0.34		0.03	49.09
Ethylbenzene	100-41-4	1,000	mg/kg	0.00033	J	0.0013	1	0.00033	J	0.0014	1	ND	U	0.0011	1	0.29	J	0.06	49.09
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0063	1	ND	U	0.0069	1	ND	U	0.0053	1	6.2		0.06	49.09
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0013	1	0.0011	J	0.0014	1	ND	U	0.0011	1	ND	U	0.03	49.09
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0013	1	0.0006	J	0.0014	1	ND	U	0.0011	1	0.47		0.06	49.09
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.001	J	0.0013	1	0.0022		0.0014	1	ND	U	0.0011	1	1.6		0.06	49.09
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	ND	U	0.046	1	0.718		0.21	1	ND	U	0.037	1	14		0.2	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.95		0.046	1	0.933		0.21	1	ND	U	0.037	1	7.9		0.2	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	2.27		0.046	1	0.926		0.21	1	ND	U	0.037	1	4.8		0.2	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.27		0.046	1	1.07		0.21	1	ND	U	0.037	1	5.1		0.2	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.42		0.046	1	0.54		0.21	1	ND	U	0.037	1	2.6		0.2	10
Chrysene	218-01-9	190,000	mg/kg	1.8		0.046	1	2.28		0.21	1	ND	U	0.037	1	9.7		0.2	10
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.046	1	1.06		0.21	1	ND	U	0.037	1	54		0.2	10
Naphthalene	91-20-3	190,000	mg/kg	0.387		0.046	1	ND	U	0.21	1	ND	U	0.037	1	15		0.2	10
Phenanthrene	85-01-8	190,000	mg/kg	ND	U	0.046	1	1.71		0.21	1	ND	U	0.037	1	86		0.2	10
Pyrene	129-00-0	190,000	mg/kg	2.16		0.046	1	3.8		0.21	1	ND	U	0.037	1	17		0.2	10
Metals																			
Lead	7439-92-1	190,000	mg/kg	140		2.6	1	330		2.2	1	99.3		2.2	1	358		0.0529	10

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Table 5
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-02-12				AOI5 BH-03-12				AOI5 BH-04-12				AOI5 BH-07-12			
			Sample ID	BH-02-12_2.5-3				BH-03-12_2.5-3				BH-04-12_2-2.5				BH-07-12_3-3.5			
			Sample Date	8/8/12				8/7/12				8/7/12				8/6/12			
			Sample Depth (ft bgs)	2.5-3				2.5-3				2-2.5				3-3.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.002	1.19	0.067		0.005	0.83	1.6	J	0.48	375.17	0.33		0.062	44.25
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.002	1.19	ND	U	0.005	0.83	ND	U	0.48	375.17	ND	U	0.062	44.25
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.002	1.19	ND	U	0.005	0.83	ND	U	0.48	375.17	ND	U	0.062	44.25
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.002	1.19	0.16		0.005	0.83	0.51	J	0.48	375.17	0.16	J	0.062	44.25
Benzene	71-43-2	330	mg/kg	ND	U	0.0008	1.19	ND	U	0.005	0.83	0.86	J	0.24	375.17	ND	U	0.031	44.25
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.002	1.19	0.007		0.005	0.83	1.5	J	0.48	375.17	ND	U	0.062	44.25
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.002	1.19	0.86		0.28	46.61	ND	U	0.48	375.17	0.27	J	0.062	44.25
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0008	1.19	ND	U	0.005	0.83	ND	U	0.24	375.17	ND	U	0.031	44.25
Toluene	108-88-3	10,000	mg/kg	ND	U	0.002	1.19	0.007		0.005	0.83	3.3		0.48	375.17	ND	U	0.062	44.25
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.002	1.19	0.025		0.005	0.83	10		0.48	375.17	ND	U	0.062	44.25
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	2.1		0.024	5	ND	U	1	10	12		0.21	10	0.83		0.14	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.8		0.024	5	ND	U	1	10	3.3		0.21	10	0.93		0.14	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.8		0.024	5	ND	U	1	10	1.6		0.21	10	0.48	J	0.14	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.2		0.024	5	ND	U	1	10	2.7		0.21	10	0.53	J	0.14	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.3		0.024	5	ND	U	1	10	1	J	0.21	10	0.46	J	0.14	1
Chrysene	218-01-9	190,000	mg/kg	1.8		0.024	5	1.4		1	10	4.1		0.21	10	1.8		0.14	1
Fluorene	86-73-7	190,000	mg/kg	1.3		0.024	5	ND	U	1	10	37		0.21	10	0.87		0.14	1
Naphthalene	91-20-3	190,000	mg/kg	9.1		0.024	5	ND	U	1	10	8.6		0.21	10	0.43	J	0.14	1
Phenanthrene	85-01-8	190,000	mg/kg	5.4		0.024	5	2.5		1	10	84		0.21	10	2.4		0.14	1
Pyrene	129-00-0	190,000	mg/kg	2.4		0.024	5	1.6		1	10	11		0.21	10	4.7		0.14	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	179		0.0312	5	56.9		0.237	2	1610		0.276	50	111		0.0121	2

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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-10-12				AOI5 BH-14-12				AOI5 BH-15-12				AOI5 BH-16-12			
			Sample ID	BH-10-12_4.5-5				BH-14-12_3.5-4				BH-15-12_4-4.5				BH-16-12_3.5-4			
			Sample Date	8/9/12				8/7/12				8/7/12				8/7/12			
			Sample Depth (ft bgs)	4.5-5				3.5-4				4-4.5				3.5-4			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.001	0.99	0.005	J	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.001	0.99	ND	U	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.001	0.99	ND	U	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.001	0.99	0.003	J	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
Benzene	71-43-2	330	mg/kg	0.025		0.0006	0.99	0.008		0.0006	0.95	ND	U	0.001	1.77	ND	U	0.005	0.81
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.001	0.99	0.003	J	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.001	0.99	0.004	J	0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0006	0.99	ND	U	0.0006	0.95	ND	U	0.001	1.77	ND	U	0.005	0.81
Toluene	108-88-3	10,000	mg/kg	ND	U	0.001	0.99	0.012		0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.001	0.99	0.012		0.001	0.95	ND	U	0.002	1.77	ND	U	0.005	0.81
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.42		0.02	5	0.48		0.044	10	0.098	J	0.041	10	0.36		0.019	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.2		0.02	5	1.2		0.044	10	0.36		0.041	10	1.3		0.019	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.1		0.02	5	1.4		0.044	10	0.28		0.041	10	1.2		0.019	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.6		0.02	5	1.7		0.044	10	0.43		0.041	10	1.4		0.019	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.95		0.02	5	1.4		0.044	10	0.2	J	0.041	10	0.75		0.019	1
Chrysene	218-01-9	190,000	mg/kg	1.4		0.02	5	1.3		0.044	10	0.66		0.041	10	1.2		0.019	1
Fluorene	86-73-7	190,000	mg/kg	0.077	J	0.02	5	0.14	J	0.044	10	ND	U	0.041	10	0.13		0.019	1
Naphthalene	91-20-3	190,000	mg/kg	0.87		0.02	5	1.6		0.044	10	0.32		0.041	10	0.044		0.019	1
Phenanthrene	85-01-8	190,000	mg/kg	1.6		0.02	5	1.1		0.044	10	0.58		0.041	10	1.3		0.019	1
Pyrene	129-00-0	190,000	mg/kg	1.8		0.02	5	1.4		0.044	10	0.51		0.041	10	2		0.019	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	1730		0.269	50	164		0.0286	5	120		0.0259	5	160		0.557	5

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			Sample ID	BH-20-12_3.5-4				BH-21-12_5.5-6				BH-31-12_3-3.5				BH-34-12_4-4.5			
			Sample Date	8/6/12				8/6/12				8/8/12				8/7/12			
			Sample Depth (ft bgs)	3.5-4				5.5-6				3-3.5				4-4.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.003	J	0.001	0.96	0.005	J	0.002	0.94	0.001	J	0.001	0.92	ND	U	0.001	1.09
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.001	0.96	ND	U	0.002	0.94	ND	U	0.001	0.92	ND	U	0.001	1.09
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.001	0.96	ND	U	0.002	0.94	ND	U	0.001	0.92	ND	U	0.001	1.09
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.002	J	0.001	0.96	0.002	J	0.002	0.94	ND	U	0.001	0.92	ND	U	0.001	1.09
Benzene	71-43-2	330	mg/kg	ND	U	0.0007	0.96	0.002	J	0.0008	0.94	0.001	J	0.0007	0.92	0.012		0.0007	1.09
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.001	0.96	ND	U	0.002	0.94	ND	U	0.001	0.92	ND	U	0.001	1.09
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.003	J	0.001	0.96	0.056		0.002	0.94	0.002	J	0.001	0.92	ND	U	0.001	1.09
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0007	0.96	ND	U	0.0008	0.94	ND	U	0.0007	0.92	ND	U	0.0007	1.09
Toluene	108-88-3	10,000	mg/kg	ND	U	0.001	0.96	0.002	J	0.002	0.94	0.002	J	0.001	0.92	0.002	J	0.001	1.09
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.004	J	0.001	0.96	0.013		0.002	0.94	0.001	J	0.001	0.92	0.021		0.001	1.09
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	1.5		0.049	10	3.3		0.057	10	1.3		0.026	5	0.65		0.044	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	2.1		0.049	10	4.1		0.057	10	0.98		0.026	5	2.4		0.044	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	2.6		0.049	10	4.1		0.057	10	0.95		0.026	5	2.5		0.044	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.7		0.049	10	3.8		0.057	10	1		0.026	5	2.8		0.044	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	2.1		0.049	10	2.6		0.057	10	0.78		0.026	5	1.7		0.044	10
Chrysene	218-01-9	190,000	mg/kg	2.7		0.049	10	5.5		0.057	10	1.3		0.026	5	2.3		0.044	10
Fluorene	86-73-7	190,000	mg/kg	1.3		0.049	10	1.8		0.057	10	1.4		0.026	5	0.21	J	0.044	10
Naphthalene	91-20-3	190,000	mg/kg	10		0.049	10	14		0.057	10	5.9		0.026	5	0.2	J	0.044	10
Phenanthrene	85-01-8	190,000	mg/kg	4.1		0.049	10	5.7		0.057	10	4.5		0.026	5	2.3		0.044	10
Pyrene	129-00-0	190,000	mg/kg	2.3		0.049	10	6.5		0.057	10	1.6		0.026	5	3.4		0.044	10
Metals																			
Lead	7439-92-1	190,000	mg/kg	377		0.063	10	314		0.037	5	152		0.0332	5	1340		0.282	50

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-35-12				AOI5 BH-36-12				AOI5 BH-37-12				AOI5 BH-38-12			
			Sample ID	BH-35-12_2.5-3				BH-36-12_3.5-4				BH-37-12_2-2.5				BH-38-12_3-3.5			
			Sample Date	8/8/12				8/7/12				8/8/12				8/7/12			
			Sample Depth (ft bgs)	2.5-3				3.5-4				2-2.5				3-3.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.005	0.84	0.003	J	0.001	0.92	0.29	J	0.094	67.4	0.003	J	0.002	1.36
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.005	0.84	ND	U	0.001	0.92	ND	U	0.094	67.4	0.002	J	0.002	1.36
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.005	0.84	ND	U	0.001	0.92	ND	U	0.094	67.4	ND	U	0.002	1.36
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.005	0.84	0.002	J	0.001	0.92	ND	U	0.094	67.4	0.002	J	0.002	1.36
Benzene	71-43-2	330	mg/kg	ND	U	0.005	0.84	0.039		0.0006	0.92	ND	U	0.047	67.4	0.005	J	0.0009	1.36
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.005	0.84	ND	U	0.001	0.92	ND	U	0.094	67.4	ND	U	0.002	1.36
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.005	0.84	ND	U	0.001	0.92	ND	U	0.094	67.4	ND	U	0.002	1.36
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.005	0.84	ND	U	0.0006	0.92	ND	U	0.047	67.4	ND	U	0.0009	1.36
Toluene	108-88-3	10,000	mg/kg	ND	U	0.005	0.84	0.014		0.001	0.92	ND	U	0.094	67.4	0.004	J	0.002	1.36
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.018		0.005	0.84	0.009		0.001	0.92	0.11	J	0.094	67.4	0.002	J	0.002	1.36
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.15		0.11	5	0.18	J	0.043	10	0.21		0.023	5	0.13	J	0.046	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.68		0.11	5	0.29		0.043	10	0.63		0.023	5	0.53		0.046	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.69		0.11	5	0.42		0.043	10	0.6		0.023	5	0.55		0.046	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.95		0.11	5	0.46		0.043	10	0.87		0.023	5	0.64		0.046	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.53		0.11	5	1		0.043	10	0.54		0.023	5	0.43		0.046	10
Chrysene	218-01-9	190,000	mg/kg	0.78		0.11	5	0.44		0.043	10	0.67		0.023	5	0.52		0.046	10
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.11	5	0.056	J	0.043	10	0.21		0.023	5	0.096	J	0.046	10
Naphthalene	91-20-3	190,000	mg/kg	0.78		0.11	5	0.28		0.043	10	1.2		0.023	5	0.83		0.046	10
Phenanthrene	85-01-8	190,000	mg/kg	0.86		0.11	5	0.28		0.043	10	0.96		0.023	5	0.49		0.046	10
Pyrene	129-00-0	190,000	mg/kg	1.2		0.11	5	0.34		0.043	10	0.92		0.023	5	0.55		0.046	10
Metals																			
Lead	7439-92-1	190,000	mg/kg	660		2.4	20	254		0.0283	5	2230		0.305	50	2890		0.299	50

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10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5 BH-39-12				AOI5 BH-40-12				AOI5_BH-13-08				AOI5_BH-13-15			
			Sample ID	BH-39-12_2-2.5				BH-40-12_3-3.5				AOI5_BH-13-08_3.5-4_031113				AOI5_BH-13-15_4.5-5_031113			
			Sample Date	8/7/12				8/7/12				3/11/13				3/11/13			
			Sample Depth (ft bgs)	2-2.5				3-3.5				3.5-4				4.5-5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.002	J	0.001	0.93	ND	U	0.001	0.94	ND	U	0.0047	1	ND	U	0.005	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.001	0.93	ND	U	0.001	0.94	ND	U	0.00094	1	ND	U	0.00099	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.001	0.93	ND	U	0.001	0.94	ND	U	0.00094	1	ND	U	0.00099	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.001	J	0.001	0.93	ND	U	0.001	0.94	ND	U	0.0047	1	ND	U	0.005	1
Benzene	71-43-2	330	mg/kg	0.021		0.0006	0.93	0.021		0.0006	0.94	ND	U	0.00094	1	ND	U	0.00099	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.001	J	0.001	0.93	0.002	J	0.001	0.94	ND	U	0.00094	1	ND	U	0.00099	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.001	0.93	ND	U	0.001	0.94	ND	U	0.0047	1	ND	U	0.005	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0006	0.93	ND	U	0.0006	0.94	ND	U	0.00094	1	ND	U	0.00099	1
Toluene	108-88-3	10,000	mg/kg	0.013		0.001	0.93	0.014		0.001	0.94	ND	U	0.00094	1	ND	U	0.00099	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.008		0.001	0.93	0.009		0.001	0.94	ND	U	0.00094	1	ND	U	0.00099	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.2	J	0.04	10	0.41		0.046	10	ND	U	0.036	1	0.0631		0.038	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.57		0.04	10	1.5		0.046	10	ND	U	0.036	1	0.0985		0.038	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.78		0.04	10	1.6		0.046	10	ND	U	0.036	1	0.0824		0.038	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.99		0.04	10	2		0.046	10	ND	U	0.036	1	0.112		0.038	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.94		0.04	10	1.3		0.046	10	ND	U	0.036	1	0.0524		0.038	1
Chrysene	218-01-9	190,000	mg/kg	0.68		0.04	10	1.8		0.046	10	ND	U	0.036	1	0.1		0.038	1
Fluorene	86-73-7	190,000	mg/kg	0.084	J	0.04	10	0.39		0.046	10	ND	U	0.036	1	ND	U	0.038	1
Naphthalene	91-20-3	190,000	mg/kg	0.48		0.04	10	0.98		0.046	10	ND	U	0.036	1	ND	U	0.038	1
Phenanthrene	85-01-8	190,000	mg/kg	0.36		0.04	10	1		0.046	10	ND	U	0.036	1	0.263		0.038	1
Pyrene	129-00-0	190,000	mg/kg	0.72		0.04	10	2.5		0.046	10	ND	U	0.036	1	0.202		0.038	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	3470		0.524	100	1140		0.298	50	34.5		2.1	1	15.6		2	1

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Table 5
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-16				AOI5_BH-13-17				AOI5_BH-13-22				AOI5_BH-13-24			
			Sample ID	AOI5_BH-13-16_3.5-4_031113				AOI5_BH-13-17_5-5.5_031113				AOI5_BH-13-22_2-2.5_030813				AOI5_BH-13-24_2-2.5_030813			
			Sample Date	3/11/13				3/11/13				3/8/13				3/8/13			
			Sample Depth (ft bgs)	3.5-4				5-5.5				2-2.5				2-2.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.686		0.6	1	ND	U	0.0062	1	ND	U	0.64	1	ND	U	6.4	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.12	1	ND	U	0.0012	1	ND	U	0.13	1	ND	U	1.3	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.12	1	ND	U	0.0012	1	ND	U	0.13	1	ND	U	1.3	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.6	1	ND	U	0.0062	1	ND	U	0.64	1	ND	U	6.4	1
Benzene	71-43-2	330	mg/kg	0.736		0.12	1	ND	U	0.0012	1	0.336		0.13	1	2.31		1.3	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.831		0.12	1	ND	U	0.0012	1	0.275		0.13	1	4.32		1.3	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.6	1	ND	U	0.0062	1	1.72		0.64	1	3160		320	50
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.12	1	ND	U	0.0012	1	ND	U	0.13	1	ND	U	1.3	1
Toluene	108-88-3	10,000	mg/kg	2.2		0.12	1	ND	U	0.0012	1	0.552		0.13	1	4.6		1.3	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	2.83		0.12	1	ND	U	0.0012	1	1.01		0.13	1	14.3		1.3	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.817		0.04	1	0.0931		0.038	1	6.45		0.21	5	3.02		0.19	5
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	3.45		0.04	1	0.19		0.038	1	2.78		0.21	5	1.38		0.19	5
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	3.56		0.04	1	0.17		0.038	1	1.99		0.21	5	0.863		0.19	5
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	3.19		0.08	2	0.256		0.038	1	2.53		0.21	5	1.63		0.19	5
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	2.06		0.04	1	0.155		0.038	1	1.06		0.21	5	0.609		0.19	5
Chrysene	218-01-9	190,000	mg/kg	3.33		0.04	1	0.307		0.038	1	2.95		0.21	5	1.9		0.19	5
Fluorene	86-73-7	190,000	mg/kg	0.322		0.04	1	ND	U	0.038	1	14.7		0.21	5	5.42		0.19	5
Naphthalene	91-20-3	190,000	mg/kg	0.507		0.04	1	0.0508		0.038	1	ND	U	0.21	5	1.37		0.19	5
Phenanthrene	85-01-8	190,000	mg/kg	1.25		0.04	1	0.316		0.038	1	29.3		0.83	20	11.8		0.19	5
Pyrene	129-00-0	190,000	mg/kg	3.81		0.04	1	0.297		0.038	1	9.1		0.21	5	3.88		0.19	5
Metals																			
Lead	7439-92-1	190,000	mg/kg	260		1.9	1	896		2.6	1	80.3		2.5	1	115		2.4	1

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-25				AOI5-BH-13-27				AOI5_BH-13-34				AOI5_BH-13-37			
			Sample ID	AOI5_BH-13-25_2.5-3_030813				AO15-BH-13-27-2.5-330713				AOI5_BH-13-34_2.5-3_30613				AOI5_BH-13-37-2.5-3_030513			
			Sample Date	3/8/13				3/7/13				3/6/13				3/5/13			
			Sample Depth (ft bgs)	2.5-3				2.5-3				2.5-3				2.5-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.72		0.55	1	ND	U	0.0056	1	ND	U	170	2.5	ND	U	0.0065	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.11	1	ND	U	0.0011	1	ND	U	***34***	2.5	ND	U	0.0013	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.11	1	ND	U	0.0011	1	ND	U	34	2.5	ND	U	0.0013	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.55	1	ND	U	0.0056	1	ND	U	170	2.5	ND	U	0.0065	1
Benzene	71-43-2	330	mg/kg	1.22		0.11	1	0.0336		0.0011	1	35.3		34	2.5	0.0011	J	0.0013	1
Ethylbenzene	100-41-4	1,000	mg/kg	1.56		0.11	1	ND	U	0.0011	1	ND	U	34	2.5	ND	U	0.0013	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	3.96		0.55	1	0.0445		0.0056	1	**23200**		1700	25	ND	U	0.0065	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.11	1	ND	U	0.0011	1	ND	U	34	2.5	ND	U	0.0013	1
Toluene	108-88-3	10,000	mg/kg	1.58		0.11	1	ND	U	0.0011	1	ND	U	34	2.5	ND	U	0.0013	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	3.66		0.11	1	ND	U	0.0011	1	ND	U	34	2.5	ND	U	0.0013	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	4.99		0.19	5	ND	U	0.042	1	0.218		0.046	1	0.328		0.042	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	5.98		0.19	5	ND	U	0.042	1	0.712		0.046	1	0.921		0.042	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	13.6		0.19	5	0.0689		0.042	1	0.642		0.046	1	0.747		0.042	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	14.1		0.19	5	0.0688		0.042	1	0.841		0.046	1	0.717		0.042	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	9.17		0.19	5	0.0535		0.042	1	0.48		0.046	1	0.451		0.042	1
Chrysene	218-01-9	190,000	mg/kg	7.02		0.19	5	0.107		0.042	1	0.769		0.046	1	0.899		0.042	1
Fluorene	86-73-7	190,000	mg/kg	7.46		0.19	5	ND	U	0.042	1	0.127		0.046	1	0.0746		0.042	1
Naphthalene	91-20-3	190,000	mg/kg	ND	U	0.19	5	ND	U	0.042	1	0.272		0.046	1	0.0579		0.042	1
Phenanthrene	85-01-8	190,000	mg/kg	15.3		0.19	5	0.123		0.042	1	0.979		0.046	1	1.05		0.042	1
Pyrene	129-00-0	190,000	mg/kg	4.53		0.19	5	0.0941		0.042	1	1.1		0.046	1	1.43		0.042	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	42.4		2.3	1	2120		2.8	1	677		2	1	1000		2.8	1

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5_BH-13-38				AOI5_BH-13-39				AOI5_BH-13-39				AOI-5_BH-13-40			
			Sample ID	AOI5_BH-13-38_3.5-4_030513				AOI5_BH-13-39_2.5-3_030513				AOI5_BH-13-39_2-2.5_030513				BH-13-40-2-2.5_030413			
			Sample Date	3/5/13				3/5/13				3/5/13				3/4/13			
			Sample Depth (ft bgs)	3.5-4				2.5-3				2-2.5				2-2.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.007	1	0.00049	J	0.0049	1	0.173	J	0.49	1	ND	U	0.0059	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0014	1	ND	U	0.00099	1	ND	U	0.098	1	ND	U	0.0012	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0014	1	ND	U	0.00099	1	ND	U	0.098	1	ND	U	0.0012	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.007	1	ND	U	0.0049	1	0.0466	J	0.49	1	ND	U	0.0059	1
Benzene	71-43-2	330	mg/kg	ND	U	0.0014	1	0.00058	J	0.00099	1	0.21		0.098	1	0.00055	J	0.0012	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.0014	1	0.00041	J	0.00099	1	0.168		0.098	1	ND	U	0.0012	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.007	1	ND	U	0.0049	1	ND	U	0.49	1	ND	U	0.0059	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0014	1	ND	U	0.00099	1	ND	U	0.098	1	ND	U	0.0012	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0014	1	0.0014		0.00099	1	0.372		0.098	1	0.00035	J	0.0012	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.0014	1	0.0022		0.00099	1	0.835		0.098	1	ND	U	0.0012	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.897		0.053	1	0.083		0.045	1	0.335		0.045	1	0.475		0.036	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	2.38		0.053	1	0.146		0.045	1	0.884		0.045	1	1.24		0.036	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	2.1		0.053	1	0.275		0.045	1	0.855		0.045	1	0.948		0.036	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.32		0.053	1	0.307		0.045	1	1.02		0.045	1	0.898		0.036	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.19		0.053	1	0.288		0.045	1	0.605		0.045	1	0.474		0.036	1
Chrysene	218-01-9	190,000	mg/kg	2.4		0.053	1	0.19		0.045	1	0.991		0.045	1	1.29		0.036	1
Fluorene	86-73-7	190,000	mg/kg	0.395		0.053	1	0.0413	J	0.045	1	0.473		0.045	1	0.144		0.036	1
Naphthalene	91-20-3	190,000	mg/kg	0.208		0.053	1	0.111		0.045	1	0.132		0.045	1	0.0524		0.036	1
Phenanthrene	85-01-8	190,000	mg/kg	3.35		0.053	1	0.152		0.045	1	1.12		0.045	1	1.97		0.036	1
Pyrene	129-00-0	190,000	mg/kg	3.67		0.053	1	0.178		0.045	1	1.53		0.045	1	2.35		0.036	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	2950		3.2	1	1740		14	5	1440		2.9	1	269		2.4	1

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI-5_BH-13-41				AOI-5_BH-13-42				AOI5_BH-13-43			
			Sample ID	BH-13-41-2-2.5_030413				BH-13-42-2.5-3_030413				BH-13-43-2-2.5_030513			
			Sample Date	3/4/13				3/4/13				3/5/13			
			Sample Depth (ft bgs)	2-2.5				2.5-3				2-2.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)															
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.0046	1	ND	U	0.0037	1	ND	U	0.0054	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0046	1	ND	U	0.0037	1	ND	U	0.0054	1
Benzene	71-43-2	330	mg/kg	0.00058	J	0.00093	1	ND	U	0.00074	1	0.00022	J	0.0011	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0046	1	ND	U	0.0037	1	ND	U	0.0054	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
Toluene	108-88-3	10,000	mg/kg	0.00032	J	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.00093	1	ND	U	0.00074	1	ND	U	0.0011	1
Semi-volatile Organic Compounds (SVOCs)															
Anthracene	120-12-7	190,000	mg/kg	0.116		0.037	1	ND	U	0.039	1	0.0959		0.042	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.309		0.037	1	0.0334	J	0.039	1	0.224		0.042	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.334		0.037	1	0.0339	J	0.039	1	0.381		0.042	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.415		0.037	1	0.0335	J	0.039	1	0.339		0.042	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.298		0.037	1	0.0295	J	0.039	1	0.524		0.042	1
Chrysene	218-01-9	190,000	mg/kg	0.376		0.037	1	0.0338	J	0.039	1	0.312		0.042	1
Fluorene	86-73-7	190,000	mg/kg	0.0947		0.037	1	ND	U	0.039	1	0.0617		0.042	1
Naphthalene	91-20-3	190,000	mg/kg	0.113		0.037	1	ND	U	0.039	1	0.083		0.042	1
Phenanthrene	85-01-8	190,000	mg/kg	0.535		0.037	1	0.0199	J	0.039	1	0.159		0.042	1
Pyrene	129-00-0	190,000	mg/kg	0.532		0.037	1	0.0455		0.039	1	0.269		0.042	1
Metals															
Lead	7439-92-1	190,000	mg/kg	712		2.3	1	232		2.5	1	878		2.7	1

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Table 5
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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	AOI5-BH-14-14				AOI5-BH-14-15				AOI5-BH-14-17				AOI5-BH-14-18			
			Sample ID	AOI-5_14-14_8-9'				AOI-5_14-15_8.0'				AOI-5_14-17_8.0'				AOI-5_14-18_7.0'			
			Sample Date	6/16/14				6/16/14				6/16/14				6/16/14			
			Sample Depth (ft bgs)	8-9				8-8.5				8-8.7				7-7.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND		0.0026	1	0.305	J	0.41	1	0.499		0.37	1	0.156	J	0.39	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND		0.0034	1	ND		0.0042	1	ND		0.0079	1	ND		0.004	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND		0.0013	1	ND		0.21	1	ND		0.19	1	ND		0.19	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND		0.0026	1	0.112	J	0.41	1	0.279	J	0.37	1	0.0673	J	0.39	1
Benzene	71-43-2	330	mg/kg	ND		0.00065	1	3.21		0.1	1	0.537		0.093	1	0.395		0.096	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND		0.0013	1	0.628		0.21	1	0.275		0.19	1	0.144	J	0.19	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND		0.0065	1	3.11		1	1	1.67		0.93	1	0.878	J	0.96	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	0.0026		0.0013	1	ND		0.21	1	ND		0.19	1	0.049	J	0.19	1
Toluene	108-88-3	10,000	mg/kg	ND		0.0013	1	0.892		0.21	1	1.49		0.19	1	0.636		0.19	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.00071	J	0.0013	1	1.63		0.21	1	0.516		0.19	1	0.282		0.19	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	1.38		0.045	1	1.21		0.054	1	NA				ND		0.051	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	8.65		0.45	10	1.3		0.054	1	NA				0.0385	J	0.051	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	10.6		0.45	10	1.1		0.054	1	NA				0.0376	J	0.051	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	11.5		0.45	10	1.13		0.054	1	NA				0.0329	J	0.051	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	5.72		0.45	10	0.563		0.054	1	NA				0.0229	J	0.051	1
Chrysene	218-01-9	190,000	mg/kg	7.82		0.45	10	1.41		0.054	1	NA				0.0351	J	0.051	1
Fluorene	86-73-7	190,000	mg/kg	0.417		0.045	1	1.08		0.054	1	NA				0.0205	J	0.051	1
Naphthalene	91-20-3	190,000	mg/kg	0.891		0.045	1	0.335		0.054	1	NA				ND		0.051	1
Phenanthrene	85-01-8	190,000	mg/kg	2.15		0.045	1	4.13		0.054	1	NA				0.0356	J	0.051	1
Pyrene	129-00-0	190,000	mg/kg	8.85		0.45	10	2.91		0.054	1	NA				0.0718		0.051	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	144		2	1	203		2	1	336		1.9	1	14.5		1.9	1

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	BH_14-19				BH_14-20				BH_14-21				BH_14-22			
			Sample ID	AOI-5_BH_14-19_6-8'				A0I-5_BH_14_20_6-8'				AOI-5_BH_14-21_4-6'				AOI-5_BH_14-22_4-6'			
			Sample Date	6/18/14				6/24/14				6/18/14				6/18/14			
			Sample Depth (ft bgs)	6-8				6-8				4-6				4-6			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.0032	1	ND	U	0.0033	1	ND	U	0.0031	1	0.00047	J	0.0029	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0061	1	ND	U	0.0081	1	ND	U	0.0079	1	ND	U	0.0036	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0032	1	ND	U	0.0033	1	ND	U	0.0031	1	ND	U	0.0029	1
Benzene	71-43-2	330	mg/kg	0.0031		0.0008	1	ND	U	0.00081	1	0.0021		0.00079	1	ND	U	0.00073	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.008	1	ND	U	0.0081	1	ND	U	0.0079	1	ND	U	0.0073	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0016	1	0.00041	J	0.0016	1	0.0011	J	0.0016	1	0.00076	J	0.0015	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.0016	1	ND	U	0.0016	1	ND	U	0.0016	1	0.00073	J	0.0015	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.0545		0.049	1	ND	U	0.054	1	7.23		0.51	10	0.587		0.048	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.147		0.049	1	ND	U	0.054	1	15		0.51	10	2.27		0.048	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.147		0.049	1	ND	U	0.054	1	14.3		0.51	10	2.57		0.048	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.146		0.049	1	ND	U	0.054	1	15.6		0.51	10	2.45		0.048	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.0825		0.049	1	ND	U	0.054	1	9.57		0.51	10	1.4		0.048	1
Chrysene	218-01-9	190,000	mg/kg	0.148		0.049	1	ND	U	0.054	1	15.9		0.51	10	2.2		0.048	1
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.049	1	ND	U	0.054	1	3.32		0.051	1	0.363		0.048	1
Naphthalene	91-20-3	190,000	mg/kg	0.0401	J	0.049	1	ND	U	0.054	1	1.3		0.051	1	0.513		0.048	1
Phenanthrene	85-01-8	190,000	mg/kg	0.101		0.049	1	ND	U	0.054	1	32.2		0.51	10	1.87		0.048	1
Pyrene	129-00-0	190,000	mg/kg	0.291		0.049	1	0.0302	J	0.054	1	34		0.51	10	3.1		0.048	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	20.7		2	1	17.1		3.1	1	473		2	1	87.6		1.9	1

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ft bgs - feet below ground surface
[1] PADEP Act 2 Non-Residental Subsurface Soil Direct Contact MSCs (last updated August 27, 2016).

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
D - Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	BH_14-24				BH_14-25				BH_14-28				BH_14-30			
			Sample ID	A0I-5_BH_14_24_4-6'				AOI-5_BH_14-25_6-8'				AOI-5_BH_14-28_4-6'				AOI-5_BH_14-30_4-6'			
			Sample Date	6/24/14				6/18/14				6/19/14				6/19/14			
			Sample Depth (ft bgs)	4-6				6-8				4-6				4-6			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.198		0.18	1	ND	U	0.0026	1	ND	U	0.003	1	ND	U	0.0028	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0035	1	ND	U	0.0036	1	ND	U	0.0064	1	ND	U	0.0036	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.09	1	ND	U	0.0013	1	ND	U	0.0015	1	ND	U	0.0014	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.0527	J	0.18	1	ND	U	0.0026	1	ND	U	0.003	1	ND	U	0.0028	1
Benzene	71-43-2	330	mg/kg	ND	U	0.045	1	0.0052		0.00064	1	**664**		4.1	1	**984**		8.2	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.107		0.09	1	ND	U	0.0013	1	0.00039	J	0.0015	1	0.00046	J	0.0014	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.0425	J	0.45	1	ND	U	0.0064	1	0.0015	J	0.0075	1	0.0034	J	0.007	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.09	1	ND	U	0.0013	1	ND	U	0.0015	1	ND	U	0.0014	1
Toluene	108-88-3	10,000	mg/kg	0.1		0.09	1	ND	U	0.0013	1	0.003		0.0015	1	0.0111		0.0014	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.492		0.09	1	ND	U	0.0013	1	0.00093	J	0.0015	1	0.00044	J	0.0014	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.0946		0.042	1	0.0399	J	0.042	1	0.184		0.042	1	0.282		0.048	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.381		0.042	1	0.0902		0.042	1	0.478		0.042	1	0.585		0.048	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.309		0.042	1	0.0909		0.042	1	0.443		0.042	1	0.622		0.048	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.373		0.042	1	0.0725		0.042	1	0.632		0.042	1	0.971		0.048	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.226		0.042	1	0.0506		0.042	1	0.332		0.042	1	0.722		0.048	1
Chrysene	218-01-9	190,000	mg/kg	0.381		0.042	1	0.0885		0.042	1	0.582		0.042	1	0.731		0.048	1
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.042	1	0.0289	J	0.042	1	0.155		0.042	1	0.221		0.048	1
Naphthalene	91-20-3	190,000	mg/kg	ND	U	0.042	1	0.0182	J	0.042	1	0.323		0.042	1	0.889		0.048	1
Phenanthrene	85-01-8	190,000	mg/kg	0.332		0.042	1	0.126		0.042	1	1.01		0.042	1	1.3		0.048	1
Pyrene	129-00-0	190,000	mg/kg	0.745		0.042	1	0.186		0.042	1	0.93		0.042	1	1.16		0.048	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	134		2.4	1	13.7		2	1	196		2	1	320		2.1	1

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	BH_14-31				BH_14-32				BH_14-33				BH_14-34			
			Sample ID	AOI-5_BH_14-31_4-6'				AOI-5-BH_14-32_4-5'				AOI-5-BH_14-33_5-6'				AOI-5-BH_14-34_5-6'			
			Sample Date	6/19/14				6/17/14				6/17/14				6/17/14			
			Sample Depth (ft bgs)	4-6				4-5				5-6				5-6			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.0035	1	1.15		0.3	1	0.384		0.28	1	0.207	J	0.47	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.004	1	ND	U	0.0031	1	ND	U	0.0032	1	ND	U	0.0033	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0018	1	ND	U	0.15	1	ND	U	0.14	1	ND	U	0.23	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0035	1	0.247	J	0.3	1	0.11	J	0.28	1	ND	U	0.47	1
Benzene	71-43-2	330	mg/kg	0.0712		0.00088	1	0.638		0.076	1	0.265		0.071	1	0.177		0.12	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.0018	1	1.71		0.15	1	0.697		0.14	1	0.407		0.23	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0088	1	28.6		0.76	1	45.1		7.1	1	71.2		5.8	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0018	1	ND	U	0.15	1	ND	U	0.14	1	ND	U	0.23	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0018	1	1.12		0.15	1	0.344		0.14	1	0.238		0.23	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.0018	1	3.47		0.15	1	1.21		0.14	1	0.735		0.23	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.16		0.046	1	1		0.04	1	0.575		0.042	1	1.54		0.043	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.966		0.046	1	0.655		0.04	1	0.922		0.042	1	1.29		0.043	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.12		0.046	1	0.547		0.04	1	0.916		0.042	1	1.09		0.043	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.46		0.046	1	0.634		0.04	1	1.08		0.042	1	1.27		0.043	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.905		0.046	1	0.284		0.04	1	0.521		0.042	1	0.562		0.043	1
Chrysene	218-01-9	190,000	mg/kg	0.997		0.046	1	0.726		0.04	1	1.05		0.042	1	1.56		0.043	1
Fluorene	86-73-7	190,000	mg/kg	0.0633		0.046	1	2.77		0.04	1	0.859		0.042	1	3.23		0.043	1
Naphthalene	91-20-3	190,000	mg/kg	0.037	J	0.046	1	ND	U	0.04	1	ND	U	0.042	1	ND	U	0.043	1
Phenanthrene	85-01-8	190,000	mg/kg	0.607		0.046	1	6.14		0.2	5	3.01		0.042	1	10.4		0.21	5
Pyrene	129-00-0	190,000	mg/kg	1.28		0.046	1	1.43		0.04	1	1.88		0.042	1	2.8		0.043	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	843		4	2	215		2	1	204		1.9	1	135		2	1

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10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	BH_14-35				BH_14-36				BH_14-37				BH-14-38			
			Sample ID	AOI-5-BH_14-35_5-6'				AOI-5_BH_14-36_4-6'				AOI-5_BH_14-37_6-8'				BH-14-38_4-6'			
			Sample Date	6/17/14				6/18/14				6/19/14				6/26/14			
			Sample Depth (ft bgs)	5-6				4-6				6-8				4-6			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.0449	J	0.26	1	ND	U	0.0023	1	ND	U	0.0033	1	ND	U	0.0022	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0032	1	ND	U	0.0034	1	ND	U	0.0047	1	ND	U	0.0031	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.13	1	ND	U	0.0012	1	ND	U	0.0017	1	ND	U	0.0011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.26	1	ND	U	0.0023	1	ND	U	0.0033	1	0.00026	J	0.0022	1
Benzene	71-43-2	330	mg/kg	ND	U	0.066	1	0.0014		0.00058	1	0.166		0.00083	1	ND	U	0.00055	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.0685	J	0.13	1	ND	U	0.0012	1	ND	U	0.0017	1	ND	U	0.0011	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	33.1		6.6	1	ND	U	0.0058	1	ND	U	0.0083	1	0.0036	J	0.0055	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.13	1	ND	U	0.0012	1	ND	U	0.0017	1	ND	U	0.0011	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.13	1	0.00061	J	0.0012	1	0.00052	J	0.0017	1	ND	U	0.0011	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.13	1	ND	U	0.0012	1	ND	U	0.0017	1	0.0007	J	0.0011	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.0238	J	0.041	1	0.163		0.045	1	0.0684		0.061	1	1.1		0.039	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.0762		0.041	1	0.527		0.045	1	0.176		0.061	1	1.28		0.039	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.0563		0.041	1	0.472		0.045	1	0.2		0.061	1	0.788		0.039	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.061		0.041	1	0.444		0.045	1	0.221		0.061	1	1.04		0.039	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.0315	J	0.041	1	0.228		0.045	1	0.129		0.061	1	0.284		0.039	1
Chrysene	218-01-9	190,000	mg/kg	0.0827		0.041	1	0.463		0.045	1	0.181		0.061	1	0.953		0.039	1
Fluorene	86-73-7	190,000	mg/kg	0.0341	J	0.041	1	0.264		0.045	1	ND	U	0.061	1	0.411		0.039	1
Naphthalene	91-20-3	190,000	mg/kg	0.0193	J	0.041	1	0.0754		0.045	1	0.0652		0.061	1	ND	U	0.039	1
Phenanthrene	85-01-8	190,000	mg/kg	0.115		0.041	1	0.419		0.045	1	0.135		0.061	1	3.28		0.039	1
Pyrene	129-00-0	190,000	mg/kg	0.134		0.041	1	0.955		0.045	1	0.228		0.061	1	3.58		0.039	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	3.1		1.9	1	45		2.1	1	103		2	1	91.3		4.6	1

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Table 5
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AOI 5 Remedial Investigation Report
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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GP-1208-PER-1				GP-1208-PER-2				GP-1208-PER-3				GP-1208-PER-4			
			Sample ID	GP-1208-PER-1				GP-1208-PER-2				GP-1208-PER-3				GP-1208-PER-4			
			Sample Date	5/30/07				5/30/07				5/30/07				5/30/07			
			Sample Depth (ft bgs)	3-3.5				3-3.5				3-3.5				3-3.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				NA			
Benzene	71-43-2	330	mg/kg	1	D	0.28	50	4.8	D	0.21	50	16	D	0.3	50	5.4	D	0.28	50
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				NA			
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA			
Chrysene	218-01-9	190,000	mg/kg	NA				NA				NA				NA			
Fluorene	86-73-7	190,000	mg/kg	NA				NA				NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA			
Pyrene	129-00-0	190,000	mg/kg	NA				NA				NA				NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				NA				NA				NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GP-1208-PER-5				GP-1208-SUB-1				GP1209-1210				GP1209-E			
			Sample ID	GP-1208-PER-5				GP-1208-SUB-1				GP1209-1210-2.6-3.1				GP1209-E-2.8-3.3			
			Sample Date	5/30/07				5/30/07				1/23/12				1/23/12			
			Sample Depth (ft bgs)	3-3.5				5-5.5				2.6-3.1				2.8-3.3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
Benzene	71-43-2	330	mg/kg	8	D	0.19	50	0.76	D	0.29	50	230		1.8	2606.16	13		0.046	65.92
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				510		3.6	2606.16	0.23	J	0.092	65.92
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				ND	U	1.8	2606.16	ND	U	0.046	65.92
Toluene	108-88-3	10,000	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				ND	U	3.6	2606.16	ND	U	0.092	65.92
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				1.2		0.018	20	ND	U	0.038	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				NA				2		0.0092	20	0.24		0.0046	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				NA				1.8		0.0092	20	0.18		0.0046	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				NA				1.6		0.0074	20	0.36		0.0037	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				2.5		0.055	20	0.64		0.028	10
Chrysene	218-01-9	190,000	mg/kg	NA				NA				2.7		0.083	20	0.36		0.042	10
Fluorene	86-73-7	190,000	mg/kg	NA				NA				0.79		0.092	20	ND	U	0.046	10
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				5.2		0.055	20	0.64		0.028	10
Pyrene	129-00-0	190,000	mg/kg	NA				NA				5.1		0.092	20	0.33		0.046	10
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				NA				2800		1.5	5	1540		0.3	1

Notes:
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ft bgs - feet below ground surface
[1] PADEP Act 2 Non-Residental Subsurface Soil Direct Contact MSCs (last updated August 27, 2016).

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
D - Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GP1209-NW				GP1209-SW				GP1210-NE				GP1210-NW			
			Sample ID	GP1209-NW-2.8-3.3				GP1209-SW-3.0-3.5				GP1210-NE-2.8-3.3				GP1210-NW-2.9-3.4			
			Sample Date	1/23/12				1/23/12				1/23/12				1/23/12			
			Sample Depth (ft bgs)	2.8-3.3				3-3.5				2.8-3.3				2.9-3.4			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	ND	U	4	3003.5	ND	U	0.1	70.15
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.096	65.24	ND	U	***56***	11488	ND	U	4	3003.5	ND	U	0.1	70.15
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	ND	U	4	3003.5	ND	U	0.1	70.15
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	ND	U	4	3003.5	ND	U	0.1	70.15
Benzene	71-43-2	330	mg/kg	4		0.048	65.24	49	J	28	11488	**1500**		5	7508.75	1.4		0.051	70.15
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	ND	U	4	3003.5	ND	U	0.1	70.15
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	26		0.096	65.24	**13000**		56	11488	2000		10	7508.75	1.5		0.1	70.15
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.048	65.24	ND	U	28	11488	ND	U	2	3003.5	ND	U	0.051	70.15
Toluene	108-88-3	10,000	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	6.5	J	4	3003.5	ND	U	0.1	70.15
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.096	65.24	ND	U	56	11488	ND	U	4	3003.5	ND	U	0.1	70.15
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.044		0.0098	10	0.77		0.033	10	0.53		0.018	20	0.023	J	0.0097	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.28		0.0049	10	1.6		0.016	10	2.2		0.0089	20	0.16		0.0049	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.27		0.0049	10	1.4		0.016	10	2.5		0.0089	20	0.13		0.0049	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.46		0.0039	10	1.2		0.013	10	2.1		0.0071	20	0.15		0.0039	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.75		0.029	10	1.8		0.098	10	3.6		0.053	20	ND	U	0.29	10
Chrysene	218-01-9	190,000	mg/kg	0.53		0.044	10	2.2		0.15	10	3.2		0.08	20	0.24		0.044	10
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.049	10	0.59	J	0.16	10	0.42		0.089	20	ND	U	0.049	10
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.34		0.029	10	4.3		0.098	10	2.7		0.053	20	0.13		0.029	10
Pyrene	129-00-0	190,000	mg/kg	0.54		0.049	10	4.1		0.16	10	3.6		0.089	20	0.27		0.049	10
Metals																			
Lead	7439-92-1	190,000	mg/kg	2490		1.59	5	1460		1.07	1	2680		1.44	5	645		0.314	1

Notes:
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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GP1210-SW				GP1212-NE				GP1212-NW				GP1212-SE			
			Sample ID	GP1210-SW-3.3-3.8				GP1212-NE-2.9-3.4				GP1212-NW-2.7-3.2				GP1212-SE-2.9-3.4			
			Sample Date	1/23/12				1/23/12				1/23/12				1/23/12			
			Sample Depth (ft bgs)	3.3-3.8				2.9-3.4				2.7-3.2				2.9-3.4			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	9.3	6462.38	ND	U	9.1	6282.61	ND	U	0.11	73.07	ND	U	10	7285.88
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	***9.3***	6462.38	ND	U	***9.1***	6282.61	ND	U	0.11	73.07	ND	U	***10***	7285.88
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	9.3	6462.38	ND	U	9.1	6282.61	ND	U	0.11	73.07	ND	U	10	7285.88
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	9.3	6462.38	ND	U	9.1	6282.61	ND	U	0.11	73.07	ND	U	10	7285.88
Benzene	71-43-2	330	mg/kg	**910**		4.6	6462.38	6.6	J	4.6	6282.61	0.18	J	0.054	73.07	ND	U	5.2	7285.88
Ethylbenzene	100-41-4	1,000	mg/kg	10	J	9.3	6462.38	ND	U	9.1	6282.61	ND	U	0.11	73.07	ND	U	10	7285.88
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	**33000**		370	258495	**28000**		360	251304	14		0.11	73.07	**30000**		420	291435
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	4.6	6462.38	ND	U	4.6	6282.61	ND	U	0.054	73.07	ND	U	5.2	7285.88
Toluene	108-88-3	10,000	mg/kg	ND	U	9.3	6462.38	ND	U	9.1	6282.61	ND	U	0.11	73.07	ND	U	10	7285.88
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	9.3	6462.38	17	J	9.1	6282.61	0.16	J	0.11	73.07	ND	U	10	7285.88
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.51		0.019	20	1.5		0.19	10	0.13		0.02	20	1.5		0.048	50
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.3		0.0096	20	3.9		0.097	10	0.98		0.0098	20	3.3		0.024	50
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.2		0.0096	20	4.3		0.097	10	1.3		0.0098	20	3.6		0.024	50
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.2		0.0076	20	3.8		0.077	10	1.1		0.0079	20	3.1		0.019	50
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	2.2		0.057	20	6.7		0.58	10	2.9		0.059	20	5.2		0.14	50
Chrysene	218-01-9	190,000	mg/kg	1.7		0.086	20	6.3		0.87	10	2.1		0.089	20	4.9		0.21	50
Fluorene	86-73-7	190,000	mg/kg	0.47		0.096	20	1.5	J	0.97	10	ND	U	0.098	20	1.3		0.24	50
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	3.4		0.057	20	6.8		0.58	10	0.68		0.059	20	6.8		0.14	50
Pyrene	129-00-0	190,000	mg/kg	3		0.096	20	8.6		0.97	10	1.9		0.098	20	7.9		0.24	50
Metals																			
Lead	7439-92-1	190,000	mg/kg	1370		0.309	1	2550		1.58	5	4440		1.61	5	2890		1.56	5

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GP1212-SW				GPBR_08212014_A11				GPBR_08212014_A11C				GPBR_08212014_A12C			
			Sample ID	GP1212-SW-2.7-3.2				GPBR_010G_08-21-2014(PH3A-11)				GPBR_011C_08-21-2014(PH3A)				GPBR_012C_08-21-2014(PH3A)			
			Sample Date	1/23/12				8/21/14				8/21/14				8/21/14			
			Sample Depth (ft bgs)	2.7-3.2				2.5-3.5				2.5-3.5				2.5-3.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.002	1.13	ND	U	0.0031	1	NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.002	1.13	ND	U	0.0092	1	NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.002	1.13	ND	U	0.0016	1	NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.002	1.13	ND	U	0.0031	1	NA				NA			
Benzene	71-43-2	330	mg/kg	0.003	J	0.0008	1.13	ND	U	0.00078	1	NA				NA			
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.002	1.13	ND	U	0.0016	1	NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.011		0.002	1.13	0.00042	J	0.0078	1	NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0008	1.13	ND	U	0.0016	1	NA				NA			
Toluene	108-88-3	10,000	mg/kg	0.002	J	0.002	1.13	ND	U	0.0016	1	NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.003	J	0.002	1.13	ND	U	0.0016	1	NA				NA			
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.56		0.019	20	NA				0.0977		0.039	1	0.116		0.037	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.6		0.0095	20	NA				0.282		0.039	1	0.296		0.037	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.7		0.0095	20	NA				0.314		0.039	1	0.366		0.037	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.5		0.0076	20	NA				0.402		0.039	1	0.407		0.037	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	2.3		0.057	20	NA				0.213		0.039	1	0.235		0.037	1
Chrysene	218-01-9	190,000	mg/kg	2.2		0.085	20	NA				0.451		0.039	1	0.437		0.037	1
Fluorene	86-73-7	190,000	mg/kg	0.36	J	0.095	20	NA				0.0259	J	0.039	1	0.0275	J	0.037	1
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				0.0621		0.039	1	0.119		0.037	1
Phenanthrene	85-01-8	190,000	mg/kg	2.4		0.057	20	NA				0.455		0.039	1	0.331		0.037	1
Pyrene	129-00-0	190,000	mg/kg	2.4		0.095	20	NA				0.609		0.039	1	0.476		0.037	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	1850		0.309	1	NA				1570		2.4	1	227		2.3	1

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBR_08212014_A13C				GPBR_08212014_A3				GPBR_08212014_A7			
			Sample ID	GPBR_013C_08-21-2014(PH3A)				GPBR_008G_08-21-2014(PH3A-3)				GPBR_009G_08-21-2014(PH3A-7)			
			Sample Date	8/21/14				8/21/14				8/21/14			
			Sample Depth (ft bgs)	2.5-3.5				2.5-3.5				2.5-3.5			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)															
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				ND	U	0.0025	1	ND	U	0.0031	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				ND	U	0.0087	1	ND	U	0.0082	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				ND	U	0.0013	1	ND	U	0.0015	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				ND	U	0.0025	1	ND	U	0.0031	1
Benzene	71-43-2	330	mg/kg	NA				ND	U	0.00063	1	ND	U	0.00077	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				ND	U	0.0013	1	ND	U	0.0015	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				ND	U	0.0063	1	ND	U	0.0077	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				ND	U	0.0013	1	ND	U	0.0015	1
Toluene	108-88-3	10,000	mg/kg	NA				ND	U	0.0013	1	ND	U	0.0015	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				ND	U	0.0013	1	ND	U	0.0015	1
Semi-volatile Organic Compounds (SVOCs)															
Anthracene	120-12-7	190,000	mg/kg	0.0317	J	0.036	1	NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.0479		0.036	1	NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.0475		0.036	1	NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.0956		0.036	1	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.041		0.036	1	NA				NA			
Chrysene	218-01-9	190,000	mg/kg	0.113		0.036	1	NA				NA			
Fluorene	86-73-7	190,000	mg/kg	ND	U	0.036	1	NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	0.0375		0.036	1	NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.108		0.036	1	NA				NA			
Pyrene	129-00-0	190,000	mg/kg	0.0803		0.036	1	NA				NA			
Metals															
Lead	7439-92-1	190,000	mg/kg	160		2.3	1	NA				NA			

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03062014_2_12				GPBT_03062014_2_1C				GPBT_03062014_2_2C			
			Sample ID	GPBT_003G_03-06-2014(STF2-12)				GPBT_001C_03-06-2014(STF2)				GPBT_002C_03-06-2014(STF2)			
			Sample Date	3/6/14				3/6/14				3/6/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)															
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.423	J	0.53	1	NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0027	1	NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.11	1	NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.147	J	0.53	1	NA				NA			
Benzene	71-43-2	330	mg/kg	0.0214	J	0.11	1	NA				NA			
Ethylbenzene	100-41-4	1,000	mg/kg	0.124		0.11	1	NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.636		0.53	1	NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.11	1	NA				NA			
Toluene	108-88-3	10,000	mg/kg	0.0716	J	0.11	1	NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.461		0.11	1	NA				NA			
Semi-volatile Organic Compounds (SVOCs)															
Anthracene	120-12-7	190,000	mg/kg	NA				1.34		0.04	1	0.649		0.037	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				0.398		0.04	1	1.04		0.037	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				0.237		0.04	1	1.07		0.037	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				0.475		0.04	1	1.49		0.037	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				0.251		0.04	1	0.921		0.037	1
Chrysene	218-01-9	190,000	mg/kg	NA				1.27		0.04	1	1.35		0.037	1
Fluorene	86-73-7	190,000	mg/kg	NA				20.2		0.4	10	0.532		0.037	1
Naphthalene	91-20-3	190,000	mg/kg	NA				0.547		0.04	1	0.245		0.037	1
Phenanthrene	85-01-8	190,000	mg/kg	NA				14.3		0.4	10	1.19		0.037	1
Pyrene	129-00-0	190,000	mg/kg	NA				1.45		0.04	1	2.59		0.037	1
Metals															
Lead	7439-92-1	190,000	mg/kg	NA				163		2.6	1	179		2.5	1

Notes:
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PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
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DF - Dilution Factor
ND - Not Detected
NA- Not Analyzed
ft bgs - feet below ground surface
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Qualifiers:
U - The compound was analyzed but not detected
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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03062014_2_3				GPBT_03062014_2_3C				GPBT_03062014_2_7			
			Sample ID	GPBT_001G_03-06-2014(STF2-3)				GPBT_003C_03-06-2014(STF2)				GPBT_002G_03-06-2014(STF2-7)			
			Sample Date	3/6/14				3/6/14				3/6/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)															
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.851	J	1.1	1	NA				0.0671	J	0.52	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0033	1	NA				ND	U	0.003	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.21	1	NA				ND	U	0.1	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.295	J	1.1	1	NA				0.0386	J	0.52	1
Benzene	71-43-2	330	mg/kg	0.14	J	0.21	1	NA				0.0261	J	0.1	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.367		0.21	1	NA				0.0523	J	0.1	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	7.71		1.1	1	NA				0.173	J	0.52	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.21	1	NA				ND	U	0.1	1
Toluene	108-88-3	10,000	mg/kg	0.801		0.21	1	NA				0.104		0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	2.52		0.21	1	NA				0.172		0.1	1
Semi-volatile Organic Compounds (SVOCs)															
Anthracene	120-12-7	190,000	mg/kg	NA				0.383		0.041	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				1.23		0.041	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				1.04		0.041	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				1.86		0.041	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				0.685		0.041	1	NA			
Chrysene	218-01-9	190,000	mg/kg	NA				1.41		0.041	1	NA			
Fluorene	86-73-7	190,000	mg/kg	NA				0.314		0.041	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	NA				0.256		0.041	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				0.702		0.041	1	NA			
Pyrene	129-00-0	190,000	mg/kg	NA				3.75		0.041	1	NA			
Metals															
Lead	7439-92-1	190,000	mg/kg	NA				299		2.8	1	NA			

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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03062014_3_4				GPBT_03062014_3_4C			
			Sample ID	GPBT_004G_03-06-2014(STF3-4)				GPBT_004C_03-06-2014(STF3)			
			Sample Date	3/6/14				3/6/14			
			Sample Depth (ft bgs)	2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)											
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	3.71		0.78	1	NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0034	1	NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.16	1	NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.567	J	0.78	1	NA			
Benzene	71-43-2	330	mg/kg	0.567		0.16	1	NA			
Ethylbenzene	100-41-4	1,000	mg/kg	0.487		0.16	1	NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	8.74		0.78	1	NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.16	1	NA			
Toluene	108-88-3	10,000	mg/kg	0.982		0.16	1	NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	1.64		0.16	1	NA			
Semi-volatile Organic Compounds (SVOCs)											
Anthracene	120-12-7	190,000	mg/kg	NA				1.76		0.39	10
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				1.15		0.39	10
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				1.11		0.39	10
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				1.36		0.39	10
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				1.09		0.39	10
Chrysene	218-01-9	190,000	mg/kg	NA				1.41		0.39	10
Fluorene	86-73-7	190,000	mg/kg	NA				4		0.39	10
Naphthalene	91-20-3	190,000	mg/kg	NA				ND	U	0.39	10
Phenanthrene	85-01-8	190,000	mg/kg	NA				8.49		0.39	10
Pyrene	129-00-0	190,000	mg/kg	NA				2.56		0.39	10
Metals											
Lead	7439-92-1	190,000	mg/kg	NA				511		2.3	1

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10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03062014_3_5C				GPBT_03062014_3_6				GPBT_03062014_3_6C				GPBT_03062014_3_8			
			Sample ID	GPBT_005C_03-06-2014(STF3)				GPBT_005G_03-06-2014(STF3-6)				GPBT_006C_03-06-2014(STF3)				GPBT_006G_03-06-2014(STF3-8)			
			Sample Date	3/6/14				3/6/14				3/6/14				3/6/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				0.868		0.74	1	NA				0.168	J	0.72	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				ND	U	0.0033	1	NA				ND	U	0.0033	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				ND	U	0.15	1	NA				ND	U	0.14	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				0.409	J	0.74	1	NA				0.0542	J	0.72	1
Benzene	71-43-2	330	mg/kg	NA				0.239		0.15	1	NA				0.101	J	0.14	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				0.38		0.15	1	NA				0.182		0.14	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				3.76		0.74	1	NA				1.55		0.72	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				ND	U	0.15	1	NA				ND	U	0.14	1
Toluene	108-88-3	10,000	mg/kg	NA				0.284		0.15	1	NA				0.18		0.14	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				1.56		0.15	1	NA				0.647		0.14	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.97		0.21	5	NA				0.33		0.036	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.61		0.21	5	NA				0.612		0.036	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.36		0.21	5	NA				0.795		0.036	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.78		0.21	5	NA				1.43		0.036	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.16		0.21	5	NA				0.794		0.036	1	NA			
Chrysene	218-01-9	190,000	mg/kg	1.69		0.21	5	NA				0.787		0.036	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.918		0.21	5	NA				0.0348	J	0.036	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	ND	U	0.21	5	NA				0.0838		0.036	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	3.2		0.21	5	NA				0.263		0.036	1	NA			
Pyrene	129-00-0	190,000	mg/kg	2.82		0.21	5	NA				0.783		0.036	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	531		2.6	1	NA				318		2.3	1	NA			

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10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03072014_4_10				GPBT_03072014_4_3				GPBT_03072014_4_4				GPBT_03072014_4_7			
			Sample ID	GPBT_009G_03-07-2014(STF4-10)				GPBT_006G_03-06-2014(RW4-3)				GPBT_007G_03-07-2014(STF4-4)				GPBT_008G_03-07-2014(STF4-7)			
			Sample Date	3/7/14				3/6/14				3/7/14				3/7/14			
			Sample Depth (ft bgs)	2-3				3.5-4.5				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.63	1	0.405	J	0.95	1	0.0871	J	0.54	1	0.365	J	3.5	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0032	1	ND	U	0.0039	1	ND	U	0.003	1	ND	U	0.0032	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.13	1	ND	U	0.19	1	ND	U	0.11	1	ND	U	0.7	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.63	1	0.163	J	0.95	1	0.0375	J	0.54	1	ND	U	3.5	1
Benzene	71-43-2	330	mg/kg	ND	U	0.13	1	0.101	J	0.19	1	0.117		0.11	1	0.64	J	0.7	1
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.13	1	0.238		0.19	1	0.11		0.11	1	0.544	J	0.7	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	1.09		0.63	1	0.716	J	0.95	1	1.01		0.54	1	5.74		3.5	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.13	1	ND	U	0.19	1	ND	U	0.11	1	ND	U	0.7	1
Toluene	108-88-3	10,000	mg/kg	0.0444	J	0.13	1	0.377		0.19	1	0.0914	J	0.11	1	0.477	J	0.7	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.167		0.13	1	1.34		0.19	1	0.399		0.11	1	1.86		0.7	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				0.553		0.094	2	NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				0.663		0.094	2	NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				0.877		0.094	2	NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				0.933		0.094	2	NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				0.9		0.094	2	NA				NA			
Chrysene	218-01-9	190,000	mg/kg	NA				0.755		0.094	2	NA				NA			
Fluorene	86-73-7	190,000	mg/kg	NA				1.16		0.094	2	NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	NA				0.341		0.094	2	NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				1.61		0.094	2	NA				NA			
Pyrene	129-00-0	190,000	mg/kg	NA				1.56		0.094	2	NA				NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				207		3	1	NA				NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03072014_4_7C				GPBT_03072014_4_8C				GPBT_03072014_4_9C				GPBT_03072014_5_1			
			Sample ID	GPBT_007C_03-07-2014(STF4)				GPBT_008C_03-07-2014(STF4)				GPBT_009C_03-07-2014(STF4)				GPBT_010G_03-07-2014(STF5-1)			
			Sample Date	3/7/14				3/7/14				3/7/14				3/7/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				0.0709	J	0.9	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				ND	U	0.0039	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				ND	U	0.18	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				ND	U	0.9	1
Benzene	71-43-2	330	mg/kg	NA				NA				NA				0.0721	J	0.18	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				ND	U	0.18	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				ND	U	0.9	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				ND	U	0.18	1
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				0.144	J	0.18	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				0.0692	J	0.18	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.578		0.041	1	0.673		0.037	1	0.189		0.039	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.815		0.041	1	1.07		0.037	1	0.247		0.039	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.957		0.041	1	1.25		0.037	1	0.322		0.039	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.952		0.041	1	1.36		0.037	1	0.41		0.039	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1		0.041	1	0.762		0.037	1	0.241		0.039	1	NA			
Chrysene	218-01-9	190,000	mg/kg	1.23		0.041	1	1.3		0.037	1	0.302		0.039	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.209		0.041	1	0.455		0.037	1	0.361		0.039	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	0.384		0.041	1	ND	U	0.037	1	ND	U	0.039	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	1.06		0.041	1	2.23		0.037	1	0.677		0.039	1	NA			
Pyrene	129-00-0	190,000	mg/kg	1.14		0.041	1	2.2		0.037	1	0.353		0.039	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	298		2	1	1860		2.5	1	106		2.6	1	NA			

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ND - Not Detected
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ft bgs - feet below ground surface
[1] PADEP Act 2 Non-Residental Subsurface Soil Direct Contact MSCs (last updated August 27, 2016).

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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03072014_5_10C				GPBT_03072014_5_11C				GPBT_03072014_5_12C				GPBT_03072014_5_6			
			Sample ID	GPBT_010C_03-07-2014(STF5)				GPBT_011C_03-07-2014(STF5)				GPBT_012C_03-07-2014(STF5)				GPBT_011G_03-07-2014(STF5-6)			
			Sample Date	3/7/14				3/7/14				3/7/14				3/7/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				0.0652	J	0.44	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				ND	U	0.0028	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				ND	U	0.089	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				0.0267	J	0.44	1
Benzene	71-43-2	330	mg/kg	NA				NA				NA				0.153		0.089	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				0.0508	J	0.089	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				ND	U	0.44	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				ND	U	0.089	1
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				0.192		0.089	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				0.247		0.089	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.687		0.041	1	3.77		0.34	10	0.124		0.037	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.86		0.041	1	5.68		0.34	10	0.194		0.037	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.84		0.041	1	4.74		0.34	10	0.266		0.037	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.06		0.041	1	4.54		0.34	10	0.277		0.037	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.929		0.041	1	2.31		0.034	1	0.269		0.037	1	NA			
Chrysene	218-01-9	190,000	mg/kg	2		0.041	1	5.47		0.34	10	0.239		0.037	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.358		0.041	1	1.43		0.034	1	0.0275	J	0.037	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	0.101		0.041	1	0.102		0.034	1	0.0808		0.037	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.525		0.041	1	9.51		0.34	10	0.221		0.037	1	NA			
Pyrene	129-00-0	190,000	mg/kg	2.51		0.041	1	13.1		0.34	10	0.305		0.037	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	138		2	1	165		2.3	1	400		2.5	1	NA			

Notes:
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10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03072014_5_8				GPBT_03102014_6_12				GPBT_03102014_6_13C				GPBT_03102014_6_14C			
			Sample ID	GPBT_012G_03-07-2014(STF5-8)				GPBT_015G_03-10-2014(STF6-12)				GPBT_013C_03-10-2014(STF6)				GPBT_014C_03-10-2014(STF6)			
			Sample Date	3/7/14				3/10/14				3/10/14				3/10/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.0046	1	ND	U	0.0056	1	NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0027	1	ND	U	0.0028	1	NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.00091	1	ND	U	0.0011	1	NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0046	1	ND	U	0.0056	1	NA				NA			
Benzene	71-43-2	330	mg/kg	ND	U	0.00091	1	ND	U	0.0011	1	NA				NA			
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.00091	1	ND	U	0.0011	1	NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0046	1	ND	U	0.0056	1	NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.00091	1	ND	U	0.0011	1	NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	0.00091	1	0.00025	J	0.0011	1	NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.00091	1	0.00035	J	0.0011	1	NA				NA			
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				0.114		0.038	1	0.121		0.036	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				NA				0.55		0.038	1	0.308		0.036	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				NA				0.605		0.038	1	0.471		0.036	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				NA				0.77		0.038	1	0.466		0.036	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				0.407		0.038	1	0.569		0.036	1
Chrysene	218-01-9	190,000	mg/kg	NA				NA				0.536		0.038	1	0.378		0.036	1
Fluorene	86-73-7	190,000	mg/kg	NA				NA				0.0484		0.038	1	0.0611		0.036	1
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				0.059		0.038	1	0.124		0.036	1
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				0.46		0.038	1	0.205		0.036	1
Pyrene	129-00-0	190,000	mg/kg	NA				NA				0.823		0.038	1	0.434		0.036	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				NA				153		2.3	1	269		2.6	1

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03102014_6_15C				GPBT_03102014_6_3				GPBT_03102014_6_9				GPBT_03102014_7_12			
			Sample ID	GPBT_015C_03-10-2014(STF6)				GPBT_013G_03-10-2014(STF6-3)				GPBT_014G_03-10-2014(STF6-9)				GPBT_018G_03-10-2014(STF7-12)			
			Sample Date	3/10/14				3/10/14				3/10/14				3/10/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				ND	U	0.0047	1	ND	U	0.0043	1	0.00027	J	0.0057	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				ND	U	0.003	1	ND	U	0.0028	1	ND	U	0.0032	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				ND	U	0.00094	1	ND	U	0.00087	1	ND	U	0.0011	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				ND	U	0.0047	1	ND	U	0.0043	1	ND	U	0.0057	1
Benzene	71-43-2	330	mg/kg	NA				ND	U	0.00094	1	ND	U	0.00087	1	ND	U	0.0011	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				0.00039	J	0.00094	1	ND	U	0.00087	1	0.00027	J	0.0011	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				ND	U	0.0047	1	ND	U	0.0043	1	ND	U	0.0057	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				ND	U	0.00094	1	ND	U	0.00087	1	ND	U	0.0011	1
Toluene	108-88-3	10,000	mg/kg	NA				ND	U	0.00094	1	ND	U	0.00087	1	ND	U	0.0011	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				0.00043	J	0.00094	1	ND	U	0.00087	1	0.00078	J	0.0011	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.114		0.036	1	NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.446		0.036	1	NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.554		0.036	1	NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.725		0.036	1	NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.51		0.036	1	NA				NA				NA			
Chrysene	218-01-9	190,000	mg/kg	0.585		0.036	1	NA				NA				NA			
Fluorene	86-73-7	190,000	mg/kg	0.0464		0.036	1	NA				NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	0.082		0.036	1	NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.286		0.036	1	NA				NA				NA			
Pyrene	129-00-0	190,000	mg/kg	0.776		0.036	1	NA				NA				NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	70.1		2.3	1	NA				NA				NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03102014_7_16C				GPBT_03102014_7_17C				GPBT_03102014_7_18C				GPBT_03102014_7_4			
			Sample ID	GPBT_016C_03-10-2014(STF7)				GPBT_017C_03-10-2014(STF7)				GPBT_018C_03-10-2014(STF7)				GPBT_016G_03-10-2014(STF7-4)			
			Sample Date	3/10/14				3/10/14				3/10/14				3/10/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				ND	U	0.004	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				ND	U	0.0028	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				ND	U	0.0008	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				ND	U	0.004	1
Benzene	71-43-2	330	mg/kg	NA				NA				NA				0.00018	J	0.0008	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				ND	U	0.0008	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				ND	U	0.004	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				ND	U	0.0008	1
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				0.00023	J	0.0008	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				0.00016	J	0.0008	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.361		0.041	1	0.731		0.034	1	0.288		0.037	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	1.03		0.041	1	2.02		0.034	1	0.837		0.037	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	1.58		0.041	1	2.13		0.034	1	1.14		0.037	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	2.18		0.041	1	2.57		0.034	1	1.43		0.037	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	1.63		0.041	1	1.37		0.034	1	1.2		0.037	1	NA			
Chrysene	218-01-9	190,000	mg/kg	1.15		0.041	1	1.8		0.034	1	0.885		0.037	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.155		0.041	1	0.292		0.034	1	0.235		0.037	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	0.217		0.041	1	0.411		0.034	1	0.26		0.037	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.384		0.041	1	2.2		0.034	1	0.438		0.037	1	NA			
Pyrene	129-00-0	190,000	mg/kg	1.23		0.041	1	3.22		0.034	1	1.11		0.037	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	323		2.6	1	163		2.3	1	370		2.4	1	NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03102014_7_8				GPBT_03112014_8_28C				GPBT_03112014_8_29C				GPBT_03112014_8_30C			
			Sample ID	GPBT_017G_03-10-2014(STF7-8)				GPBT_028C_03-11-2014(STF 8)				GPBT_029C_03-11-2014(STF 8)				GPBT_030C_03-11-2014(STF 8)			
			Sample Date	3/10/14				3/11/14				3/11/14				3/11/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.0056	1	NA				NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.003	1	NA				NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0011	1	NA				NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0056	1	NA				NA				NA			
Benzene	71-43-2	330	mg/kg	0.00074	J	0.0011	1	NA				NA				NA			
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.0011	1	NA				NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.0056	1	NA				NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0011	1	NA				NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0011	1	NA				NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.0011	1	NA				NA				NA			
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				0.775		0.04	1	1.36		0.047	1	2.7		0.22	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				0.98		0.04	1	0.694		0.047	1	1.36		0.22	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				1.4		0.04	1	1.19		0.047	1	1.55		0.22	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				1.54		0.04	1	1.23		0.047	1	1.29		0.22	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				1.03		0.04	1	1.21		0.047	1	1.29		0.22	1
Chrysene	218-01-9	190,000	mg/kg	NA				1.01		0.04	1	0.767		0.047	1	2.22		0.22	1
Fluorene	86-73-7	190,000	mg/kg	NA				0.916		0.04	1	3.31		0.047	1	5.45		0.22	1
Naphthalene	91-20-3	190,000	mg/kg	NA				ND	U	0.04	1	ND	U	0.047	1	ND	U	0.22	1
Phenanthrene	85-01-8	190,000	mg/kg	NA				1.34		0.04	1	9.15		0.19	4	10.7		0.22	1
Pyrene	129-00-0	190,000	mg/kg	NA				1.18		0.04	1	1.24		0.047	1	4.03		0.22	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				235		2.6	1	208		3.2	1	141		2.8	1

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ft bgs - feet below ground surface
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Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03112014_8_4				GPBT_03112014_8_5				GPBT_03112014_8_8				GPBT_03112014_9_1			
			Sample ID	GPBT_025G_03-11-2014(STF 8-4)				GPBT_026G_03-11-2014(STF 8-5)				GPBT_027G_03-11-2014(STF 8-8)				GPBT_019G_03-11-2014(STF 9-1)			
			Sample Date	3/11/14				3/11/14				3/11/14				3/11/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.13	J	0.79	1	0.104	J	1.1	1	0.078	J	0.8	1	0.0019	J	0.0079	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0038	1	ND	U	0.0043	1	ND	U	0.0039	1	ND	U	0.0039	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.16	1	ND	U	0.23	1	ND	U	0.16	1	ND	U	0.0016	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	0.0432	J	0.79	1	ND	U	1.1	1	ND	U	0.8	1	ND	U	0.0079	1
Benzene	71-43-2	330	mg/kg	ND	U	0.16	1	ND	U	0.23	1	ND	U	0.16	1	ND	U	0.0016	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.0632	J	0.16	1	0.0751	J	0.23	1	0.06	J	0.16	1	0.002		0.0016	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.0925	J	0.79	1	ND	U	1.1	1	0.465	J	0.8	1	0.13		0.0079	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.16	1	ND	U	0.23	1	ND	U	0.16	1	ND	U	0.0016	1
Toluene	108-88-3	10,000	mg/kg	0.139	J	0.16	1	0.0699	J	0.23	1	0.0512	J	0.16	1	0.0017		0.0016	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.313		0.16	1	0.143	J	0.23	1	0.0961	J	0.16	1	0.0069		0.0016	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA			
Chrysene	218-01-9	190,000	mg/kg	NA				NA				NA				NA			
Fluorene	86-73-7	190,000	mg/kg	NA				NA				NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA			
Pyrene	129-00-0	190,000	mg/kg	NA				NA				NA				NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				NA				NA				NA			

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Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03112014_9_22C				GPBT_03112014_9_23C				GPBT_03112014_9_24C				GPBT_03112014_9_4			
			Sample ID	GPBT_022C_03-11-2014(STF 9)				GPBT_023C_03-11-2014(STF 9)				GPBT_024C_03-11-2014(STF 9)				GPBT_020G_03-11-2014(STF 9-4)			
			Sample Date	3/11/14				3/11/14				3/11/14				3/11/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				0.427	J	0.62	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				ND	U	0.003	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				ND	U	0.12	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				0.0636	J	0.62	1
Benzene	71-43-2	330	mg/kg	NA				NA				NA				ND	U	0.12	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				0.162		0.12	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				1.11		0.62	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				ND	U	0.12	1
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				0.0375	J	0.12	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				0.617		0.12	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.779		0.25	5	0.634		0.052	1	0.584		0.045	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.621		0.25	5	0.851		0.052	1	0.775		0.045	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.697		0.25	5	0.786		0.052	1	0.963		0.045	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.841		0.25	5	0.886		0.052	1	0.981		0.045	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.523		0.25	5	0.615		0.052	1	0.785		0.045	1	NA			
Chrysene	218-01-9	190,000	mg/kg	0.801		0.25	5	0.86		0.052	1	0.871		0.045	1	NA			
Fluorene	86-73-7	190,000	mg/kg	1.37		0.25	5	0.716		0.052	1	0.76		0.045	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	ND	U	0.25	5	ND	U	0.052	1	0.431		0.045	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	3.62		0.25	5	1.6		0.052	1	2.48		0.045	1	NA			
Pyrene	129-00-0	190,000	mg/kg	1.43		0.25	5	1.39		0.052	1	1.2		0.045	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	222		2.8	1	336		3.1	1	485		3.1	1	NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03112014_9_8				GPBT_03122014_1_1				GPBT_03122014_1_12				GPBT_03122014_1_3			
			Sample ID	GPBT_021G_03-11-2014(STF 9-8)				GPBT_031G_03-12-2014 (STF1-1)				GPBT_033G_03-12-2014 (STF1-12)				GPBT_032G_03-12-2014 (STF1-3)			
			Sample Date	3/11/14				3/12/14				3/12/14				3/12/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	0.0018	J	0.0091	1	0.0508	J	0.61	1	ND	U	1.1	1	ND	U	0.01	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0043	1	ND	U	0.0027	1	ND	U	0.0029	1	ND	U	0.0033	1
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0018	1	ND	U	0.12	1	ND	U	0.22	1	ND	U	0.002	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.0091	1	ND	U	0.61	1	ND	U	1.1	1	ND	U	0.01	1
Benzene	71-43-2	330	mg/kg	ND	U	0.0018	1	0.0248	J	0.12	1	ND	U	0.22	1	ND	U	0.002	1
Ethylbenzene	100-41-4	1,000	mg/kg	0.00085	J	0.0018	1	ND	U	0.12	1	ND	U	0.22	1	ND	U	0.002	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	0.0128		0.0091	1	0.0272	J	0.61	1	ND	U	1.1	1	ND	U	0.01	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0018	1	ND	U	0.12	1	ND	U	0.22	1	ND	U	0.002	1
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0018	1	ND	U	0.12	1	ND	U	0.22	1	ND	U	0.002	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	0.004		0.0018	1	0.0367	J	0.12	1	0.0872	J	0.22	1	ND	U	0.002	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	NA				NA				NA				NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	NA				NA				NA				NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	NA				NA				NA				NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	NA				NA				NA				NA			
Chrysene	218-01-9	190,000	mg/kg	NA				NA				NA				NA			
Fluorene	86-73-7	190,000	mg/kg	NA				NA				NA				NA			
Naphthalene	91-20-3	190,000	mg/kg	NA				NA				NA				NA			
Phenanthrene	85-01-8	190,000	mg/kg	NA				NA				NA				NA			
Pyrene	129-00-0	190,000	mg/kg	NA				NA				NA				NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	NA				NA				NA				NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03122014_1_31C				GPBT_03122014_1_32C				GPBT_03122014_1_33C				GPBT_03122014_10_1			
			Sample ID	GPBT_031C_03-12-2014 (STF1)				GPBT_032C_03-12-2014 (STF1)				GPBT_033C_03-12-2014 (STF1)				GPBT_034G_03-12-2014 (STF10-1)			
			Sample Date	3/12/14				3/12/14				3/12/14				3/12/14			
			Sample Depth (ft bgs)	2-3				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				NA				NA				1.19		0.93	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				NA				NA				ND	U	0.003	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				NA				NA				ND	U	0.19	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				NA				NA				0.221	J	0.93	1
Benzene	71-43-2	330	mg/kg	NA				NA				NA				0.817		0.19	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				NA				NA				1.12		0.19	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				NA				NA				1.14		0.93	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				NA				NA				ND	U	0.19	1
Toluene	108-88-3	10,000	mg/kg	NA				NA				NA				0.442		0.19	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				NA				NA				2.6		0.19	1
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.128		0.038	1	0.117	J	0.2	1	2.18		0.2	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.402		0.038	1	0.723		0.2	1	4.79		0.2	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.446		0.038	1	0.777		0.2	1	3.46		0.2	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.5		0.038	1	0.864		0.2	1	3.7		0.2	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.223		0.038	1	0.293		0.2	1	1.44		0.2	1	NA			
Chrysene	218-01-9	190,000	mg/kg	0.408		0.038	1	0.82		0.2	1	4.76		0.2	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.0629		0.038	1	0.1	J	0.2	1	0.877		0.2	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	0.0299	J	0.038	1	ND	U	0.2	1	0.17	J	0.2	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.323		0.038	1	0.466		0.2	1	9.21		0.2	1	NA			
Pyrene	129-00-0	190,000	mg/kg	0.631		0.038	1	0.748		0.2	1	7.8		0.2	1	NA			
Metals																			
Lead	7439-92-1	190,000	mg/kg	285		2.4	1	370		2.4	1	518		2.6	1	NA			

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Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03122014_10_10				GPBT_03122014_10_3				GPBT_03122014_10_34C				GPBT_03122014_10_35C			
			Sample ID	GPBT_011G_03-12-2014(RW10-10)				GPBT_035G_03-12-2014 (STF10-3)				GPBT_034C_03-12-2014 (STF10)				GPBT_035C_03-12-2014 (STF10)			
			Sample Date	3/12/14				3/12/14				3/12/14				3/12/14			
			Sample Depth (ft bgs)	3.7-4.7				2-3				2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF	Result	Q	DL	DF
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	ND	U	0.006	1	0.149	J	0.84	1	NA				NA			
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	ND	U	0.0036	1	ND	U	0.0029	1	NA				NA			
1,2-Dichloroethane	107-06-2	98	mg/kg	ND	U	0.0012	1	ND	U	0.17	1	NA				NA			
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	ND	U	0.006	1	0.047	J	0.84	1	NA				NA			
Benzene	71-43-2	330	mg/kg	ND	U	0.0012	1	0.362		0.17	1	NA				NA			
Ethylbenzene	100-41-4	1,000	mg/kg	ND	U	0.0012	1	0.359		0.17	1	NA				NA			
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	ND	U	0.006	1	2.09		0.84	1	NA				NA			
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	ND	U	0.0012	1	ND	U	0.17	1	NA				NA			
Toluene	108-88-3	10,000	mg/kg	ND	U	0.0012	1	0.13	J	0.17	1	NA				NA			
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	ND	U	0.0012	1	0.619		0.17	1	NA				NA			
Semi-volatile Organic Compounds (SVOCs)																			
Anthracene	120-12-7	190,000	mg/kg	0.182		0.073	1	NA				0.732		0.036	1	1.12		0.041	1
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.482		0.073	1	NA				0.289		0.036	1	1.65		0.041	1
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.602		0.073	1	NA				0.214		0.036	1	1.66		0.041	1
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	0.629		0.073	1	NA				0.337		0.036	1	2.03		0.041	1
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.473		0.073	1	NA				0.144		0.036	1	1.01		0.041	1
Chrysene	218-01-9	190,000	mg/kg	0.529		0.073	1	NA				0.34		0.036	1	1.68		0.041	1
Fluorene	86-73-7	190,000	mg/kg	0.0569	J	0.073	1	NA				3.26		0.036	1	2.04		0.041	1
Naphthalene	91-20-3	190,000	mg/kg	0.263		0.073	1	NA				ND	U	0.036	1	ND	U	0.041	1
Phenanthrene	85-01-8	190,000	mg/kg	0.393		0.073	1	NA				7.96		0.18	5	5.68		0.16	4
Pyrene	129-00-0	190,000	mg/kg	0.788		0.073	1	NA				0.829		0.036	1	3.97		0.041	1
Metals																			
Lead	7439-92-1	190,000	mg/kg	308		3	1	NA				178		2.2	1	1560		2.5	1

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA- Not Analyzed
ft bgs - feet below ground surface
[1] PADEP Act 2 Non-Residental Subsurface Soil Direct Contact MSCs (last updated August 27, 2016).

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
D - Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 5
Summary of Subsurface Soil Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No	PADEP Non-Residential Subsurface Soil Direct Contact MSC[1]	Location ID	GPBT_03122014_10_36C				GPBT_03122014_10_6			
			Sample ID	GPBT_036C_03-12-2014 (STF10)				GPBT_036G_03-12-2014 (STF10-6)			
			Sample Date	3/12/14				3/12/14			
			Sample Depth (ft bgs)	2-3				2-3			
			Unit	Result	Q	DL	DF	Result	Q	RL	DF
Volatile Organic Compounds (VOCs)											
1,2,4-Trimethylbenzene	95-63-6	640	mg/kg	NA				0.169	J	1.2	1
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	4.3	mg/kg	NA				ND	U	0.003	1
1,2-Dichloroethane	107-06-2	98	mg/kg	NA				ND	U	0.25	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	10,000	mg/kg	NA				ND	U	1.2	1
Benzene	71-43-2	330	mg/kg	NA				ND	U	0.25	1
Ethylbenzene	100-41-4	1,000	mg/kg	NA				0.125	J	0.25	1
Isopropylbenzene (Cumene)	98-82-8	10,000	mg/kg	NA				2.42		1.2	1
Methyl Tert-Butyl Ether	1634-04-4	9,900	mg/kg	NA				ND	U	0.25	1
Toluene	108-88-3	10,000	mg/kg	NA				0.0554	J	0.25	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	9,100	mg/kg	NA				0.318		0.25	1
Semi-volatile Organic Compounds (SVOCs)											
Anthracene	120-12-7	190,000	mg/kg	0.193		0.041	1	NA			
Benzo(A)Anthracene	56-55-3	190,000	mg/kg	0.931		0.041	1	NA			
Benzo(A)Pyrene	50-32-8	190,000	mg/kg	0.906		0.041	1	NA			
Benzo(B)Fluoranthene	205-99-2	190,000	mg/kg	1.07		0.041	1	NA			
Benzo(G,H,I)Perylene	191-24-2	190,000	mg/kg	0.582		0.041	1	NA			
Chrysene	218-01-9	190,000	mg/kg	1.01		0.041	1	NA			
Fluorene	86-73-7	190,000	mg/kg	0.0427		0.041	1	NA			
Naphthalene	91-20-3	190,000	mg/kg	0.0425		0.041	1	NA			
Phenanthrene	85-01-8	190,000	mg/kg	0.618		0.041	1	NA			
Pyrene	129-00-0	190,000	mg/kg	1.13		0.041	1	NA			
Metals											
Lead	7439-92-1	190,000	mg/kg	789		2.5	1	NA			

Notes:
CAS No - Chemical Abstracts Service Registry Number
PADEP - Pennsylvania Department of Environmental Protection Agency
MSC - Medium Specific Concentration
mg/kg - milligram per kilogram
Q - Qualifier
DL - May be reporting limit or method detection limit
DF - Dilution Factor
ND - Not Detected
NA- Not Analyzed
ft bgs - feet below ground surface
[1] PADEP Act 2 Non-Residental Subsurface Soil Direct Contact MSCs (last updated August 27, 2016).

Qualifiers:
U - The compound was analyzed but not detected
J - Estimated value. Result between method detection and reporting limits
D - Indicates a dilution

Exceedance Summary:
10 Reported result exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC.
10 DL exceeds the PADEP Non-Residential Subsurface Soil Direct Contact MSC

Table 6
PES Butane Rail Line Soil Sample Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Section Name and Size	Composite Sample ID	Boring Location ID	Grab Sample PID Reading (ppm)	Grab Sample ID for VOC analysis
1	GPBT_031C_03-12-2014 (STF1)	1-1	17	GPBT_031G_03-12-2014 (STF1-1)
		1-2	0	NA
		1-3	4	GPBT_032G_03-12-2014 (STF1-3)
		1-4	0	NA
	GPBT_032C_03-12-2014 (STF1)	1-5	0	NA
		1-6	0	NA
		1-7	0	NA
		1-8	0	NA
	GPBT_033C_03-12-2014 (STF1)	1-9	0	NA
		1-10	0	NA
		1-11	0	NA
		1-12	6	GPBT_033G_03-12-2014 (STF1-12)
2	GPBT_001C_03-06-2014(STF2)	2-1	0	NA
		2-2	44	NA
		2-3	67	GPBT_001G_03-06-2014(STF2-3)
		2-4	58	NA
	GPBT_002C_03-06-2014(STF2)	2-5	20	NA
		2-6	60	NA
		2-7	82	GPBT_002G_03-06-2014(STF2-7)
		2-8	20	NA
	GPBT_003C_03-06-2014(STF2)	2-9	22	NA
		2-10	4	NA
		2-11	40	NA
		2-12	125	GPBT_003G_03-06-2014(STF2-12)
3	GPBT_004C_03-06-2014(STF3)	3-1	8	NA
		3-2	4	NA
		3-3	7	NA
		3-4	299	GPBT_004G_03-06-2014(STF3-4)
	GPBT_005C_03-06-2014(STF3)	3-5	35	NA
		3-6	298	GPBT_005G_03-06-2014(STF3-6)
		3-7	13	NA
		3-8	134	GPBT_006G_03-06-2014(ST3-8)
	GPBT_006C_03-06-2014(STF3)	3-9	2	NA
		3-10	53	NA
		3-11	38	NA
		3-12	0	NA
4	GPBT_007C_03-07-2014(STF4)	4-1	0	NA
		4-2	70	NA
		4-3	0	NA
		4-5	166	NA
	GPBT_008C_03-07-2014(STF4)	4-4	272	GPBT_007G_03-07-2014(STF4-4)
		4-6	142	NA
		4-7	341	GPBT_008G_03-07-2014(STF4-7)
		4-8	7	NA
	GPBT_009C_03-07-2014(STF4)	4-9	5	NA
		4-10	174	GPBT_009G_03-07-2014(STF4-10)
		4-11	9	NA
		4-12	1	NA
5	GPBT_010C_03-07-2014(STF5)	5-1	1	GPBT_010G_03-07-2014(STF5-1)
		5-2	0	NA
		5-3	0	NA
		5-4	0	NA
	GPBT_011C_03-07-2014(STF5)	5-5	0	NA
		5-6	2	GPBT_011G_03-07-2014(STF5-6)
		5-7	0	NA
		5-8	1	GPBT_012G_03-07-2014(STF5-8)
	GPBT_012C_03-07-2014(STF5)	5-9	0	NA
		5-10	0	NA
		5-11	0	NA
		5-12	0	NA

Notes:
Gray highlighting indicates boring location identification and associated PID measurement for each of the three highest PID concentrations per section and the grab sample identification for laboratory VOC analysis.
PID: Photo Ionization Detector
ppm: parts per million
VOC: Volatile Organic Compounds
NA: not applicable
Sources: "Composite Sample and Field Data Summary", Stantec, March 2014
"Composite Sample and Field Data Summary", Stantec, August 2014

Table 6
PES Butane Rail Line Soil Sample Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Section Name and Size	Composite Sample ID	Boring Location ID	Grab Sample PID Reading (ppm)	Grab Sample ID for VOC analysis
6	GPBT_013C_03-10-2014(STF6)	6-1	0	NA
		6-2	0	NA
		6-7	0	NA
		6-12	3	GPBT_015G_03-10-2014(STF6-12)
	GPBT_014C_03-10-2014(STF6)	6-3	0	GPBT_013G_03-10-2014(STF6-3)
		6-4	0	NA
		6-5	0	NA
		6-6	0	NA
	GPBT_015C_03-10-2014(STF6)	6-8	0	NA
		6-9	1	GPBT_014G_03-10-2014(STF6-9)
		6-10	0	NA
		6-11	0	NA
7	GPBT_016C_03-10-2014(STF7)	7-1	0	NA
		7-2	0	NA
		7-3	0	NA
		7-12	2	GPBT_018G_03-10-2014(STF7-12)
	GPBT_017C_03-10-2014(STF7)	7-4	0	GPBT_016G_03-10-2014(STF7-4)
		7-5	0	NA
		7-6	0	NA
		7-7	0	NA
	GPBT_018C_03-10-2014(STF7)	7-8	0	GPBT_017G_03-10-2014(STF7-8)
		7-9	0	NA
		7-10	0	NA
		7-11	0	NA
8	GPBT_028C_03-11-2014(STF 8)	8-1	2	NA
		8-2	1	NA
		8-3	8	NA
		8-4	38	GPBT_025G_03-11-2014(STF 8-4)
	GPBT_029C_03-11-2014(STF 8)	8-5	55	GPBT_026G_03-11-2014(STF 8-5)
		8-6	23	NA
		8-7	5	NA
		8-8	69	GPBT_027G_03-11-2014(STF 8-8)
	GPBT_030C_03-11-2014(STF 8)	8-9	34	NA
		8-10	27	NA
		8-11	27	NA
		8-12	16	NA
9	GPBT_022C_03-11-2014(STF 9)	9-1	28	GPBT_019G_03-11-2014(STF 9-1)
		9-2	8	NA
		9-3	1	NA
		9-4	12	GPBT_020G_03-11-2014(STF 9-4)
	GPBT_023C_03-11-2014(STF 9)	9-5	2	NA
		9-6	1	NA
		9-7	3	NA
		9-8	9	GPBT_021G_03-11-2014(STF 9-8)
	GPBT_024C_03-11-2014(STF 9)	9-9	2	NA
		9-10	2	NA
		9-11	1	NA
		9-12	7	NA
10	GPBT_034C_03-12-2014 (STF10)	10-1	103	GPBT_034G_03-12-2014 (STF10-1)
		10-2	65	NA
		10-3	72	GPBT_035G_03-12-2014 (STF10-3)
		10-5	57	NA
	GPBT_035C_03-12-2014 (STF10)	10-4	17	NA
		10-6	73	GPBT_036G_03-12-2014 (STF10-6)
		10-7	18	NA
		10-8	6	NA
	GPBT_036C_03-12-2014 (STF10)	10-9	6	NA
		10-10	3	NA
		10-11	0	NA
		10-12	0	NA

Notes:
Gray highlighting indicates boring location identification and associated PID measurement for each of the three highest PID concentrations per section and the grab sample identification for laboratory VOC analysis.
PID: Photo Ionization Detector
ppm: parts per million
VOC: Volatile Organic Compounds
NA: not applicable
Sources: "Composite Sample and Field Data Summary", Stantec, March 2014
"Composite Sample and Field Data Summary", Stantec, August 2014

Table 6
PES Butane Rail Line Soil Sample Summary
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Section Name and Size	Composite Sample ID	Boring Location ID	Grab Sample PID Reading (ppm)	Grab Sample ID for VOC analysis
PECO 1000 cubic yards	GPBR_003C_08-20-2014(PECO)	PECO 1	0.0	NA
		PECO 2	0.0	NA
		PECO 3	0.0	NA
		PECO 4	0.0	NA
	GPBR_004C_08-20-2014(PECO)	PECO 5	0.0	NA
		PECO 6	2.0	GPBR_001G_08-20-2014 (PECO6)
		PECO 7	0.0	NA
		PECO 8	1.0	GPBR_002G_08-20-2014 (PECO8) GPBR_006G_08-20-2014 (PECO8)[1]
	GPBR_005C_08-20-2014(PECO)2	PECO 92	0.0	NA
		PECO 10[2]	0.0	NA
		PECO 11[2]	0.0	NA
		PECO 12[2]	0.0	NA
A 3000 cubic yards	GPBR_011C_08-21-2014(PH3A)	A-1	0.0	NA
		A-2	0.0	NA
		A-3	0.0	GPBR_008G_08-21-2014 (PH3A-3)
		A-4	0.0	NA
	GPBR_012C_08-21-2014(PH3A)	A-5	0.0	NA
		A-6	0.0	NA
		A-7	0.0	GPBR_009G_08-21-2014 (PH3A-7)
		A-8	0.0	NA
	GPBR_013C_08-21-2014(PH3A)	A-9	0.0	NA
		A-10	0.0	NA
		A-11	0.0	GPBR_010G_08-21-2014 (PH3A-11)
		A-12	0.0	NA
B 3000 cubic yards	GPBR_017C_08-21-2014(PH3B)	B-1	1.0	NA
		B-2	0.0	NA
		B-3	1.0	GPBR_014G_08-21-2014 (PH3B-3)
		B-4	0.0	NA
	GPBR_018C_08-21-2014(PH3B)	B-5	1.0	GPBR_015G_08-21-2014 (PH3B-5)
		B-6	0.0	NA
		B-7	0.0	NA
		B-8	3.0	GPBR_016G_08-21-2014 (PH3B-8)
	GPBR_019C_08-21-2014(PH3B)	B-9	0.0	NA
		B-10	0.0	NA
		B-11	0.0	NA
		B-12	0.0	NA

Notes:
Gray highlighting indicates boring location identification and associated PID measurement for each of the three highest PID concentrations per section and the grab sample identification for laboratory VOC analysis.
PID: Photo Ionization Detector
ppm: parts per million
VOC: Volatile Organic Compounds
NA: not applicable
Sources: "Composite Sample and Field Data Summary", Stantec, March 2014
"Composite Sample and Field Data Summary", Stantec, August 2014

1. Grab sample GPBR_006G_08-20-2014 (PECO8) was collected from boring PECO 8 for analysis for VOC waste characterization parameters. A five point composite sample, GPBR_007C_08-20-2014 (PECO) was collected from borings PECO 2, PECO 4, PECO 6, PECO 9, and PECO 12 for additional waste characterization analyses.
2. Boring locations PECO 9, PECO 10, PECO 11, and PECO 12 were completed at the request of PECO for characterization of soils in the roadway footprint. A composite sample, GPBR_005C_08-20-2014(PECO), was collected from soil from these borings, as requested.

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-1_1242006					A-1_050707					A-1_071814					A-1_102214					A-10_1252006					A-10_050807				
			Sample Date	12/4/2006					5/7/2007					7/18/2014					10/22/2014					12/5/2006					5/8/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					NA					ND	U	0.19	2	1	ND	U	0.012	0.1	1	NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.26***	1	1	NA					ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					NA					ND	U	0.17	2	1	ND	U	0.26	1	1	NA					NA				
Benzene	71-43-2	5	ug/L	ND	U	0.5	1	1	ND	U	0.5	5	1	0.42	J	0.21	0.5	1	ND	U	0.01	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	2.5		0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.012	0.1	1	0.98	J	0.5	1	1	0.7	J	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.016	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.02	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	14		0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.015	0.1	1	0.69	J	0.5	3	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					0.468		0.02	0.1	1	ND	U	0.012	0.1	1	NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					2.23		0.012	0.1	1	ND	U	0.4	1	1	NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					**2.55**		0.012	0.1	1	ND	U	0.0081	0.02	1	NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					**3.39**		0.01	0.1	1	ND	U	0.036	0.1	1	NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					**1.77**		0.016	0.1	1	ND	U	0.017	0.1	1	NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.5	1	1	ND	U	0.00052	1	1	**2.34**		0.012	0.1	1	ND	U	1.3	3	1	ND	U	0.5	1	1	ND	U	0.0005	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.5	1	1	ND	U	0.00052	1	1	0.154		0.017	0.1	1	ND	U	0.17	2	1	0.8	J	0.5	1	1	ND	U	0.0005	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.5	1	1	ND	U	0.00052	1	1	0.2		0.036	0.1	1	ND	U	0.22	1	1	1.5		0.5	1	1	ND	U	0.0005	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.5	1	1	ND	U	0.00052	1	1	1.64		0.021	0.1	1	ND	U	0.3	1	1	1.1		0.5	1	1	ND	U	0.0005	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.5	1	1	ND	U	0.00052	1	1	3.21		0.015	0.1	1	ND	U	0.021	0.1	1	1		0.5	1	1	ND	U	0.0005	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	**7.1**		1.3	3	1	**9.8**		0.012	0.1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-10_072414					A-10_101314					A-11_050707					A-11-072214					A-11_100914					A-118_1262006				
			Sample Date	7/24/2014					10/13/2014					5/7/2007					7/22/2014					10/9/2014					12/6/2006				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.19	2	1	NA					ND	U	0.19	2	1	ND	U	0.016	0.1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	***0.4***	1	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.2***	1	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.17	2	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.22	1	1	NA					ND	U	0.17	2	1	ND	U	0.19	2	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.015	0.1	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.3	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.26	1	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	0.93	J	0.26	1	1	0.5	J	0.18	0.5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.01	0.1	1	6.3		0.5	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.26	1	1	3.3	J	0.5	5	1	0.71	J	0.26	1	1	0.87	J	0.0081	0.02	1	ND	U	0.5	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.2	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.26	1	1	ND	U	0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.45	J	0.2	1	1	0.3	J	0.085	0.5	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.02	0.1	1	ND	U	0.5	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	10.3		0.1	0.5	5	0.221		0.22	1	1	NA					ND	U	0.02	0.1	1	ND	U	0.012	0.1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	**16.6**		0.058	0.5	5	ND	U	0.01	0.1	1	NA					ND	U	0.012	0.1	1	0.17		0.011	0.02	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**14**		0.062	0.5	5	ND	U	0.016	0.1	1	NA					ND	U	0.012	0.1	1	0.124		1.3	3	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**16.4**		0.051	0.5	5	ND	U	0.02	0.1	1	NA					ND	U	0.01	0.1	1	0.138		0.018	0.1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**9.47**		0.078	0.5	5	ND	U	0.26	1	1	NA					ND	U	0.016	0.1	1	ND	U	0.012	0.1	1	NA				
Chrysene	218-01-9	1.9	ug/L	**15.3**		0.059	0.5	5	ND	U	0.015	0.1	1	ND	U	0.00049	1	1	0.124		0.012	0.1	1	0.192		0.037	0.1	1	ND	U	0.5	1	1
Fluorene	86-73-7	1900	ug/L	14.3		0.085	0.5	5	0.685		0.21	0.5	1	ND	U	0.00049	1	1	0.266		0.017	0.1	1	0.196		0.4	1	1	0.72	J	0.5	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.18	0.5	5	ND	U	0.012	0.1	1	ND	U	0.00049	1	1	ND	U	0.036	0.1	1	0.12		0.3	1	1	ND	U	0.5	1	1
Phenanthrene	85-01-8	1100	ug/L	20.3		0.1	0.5	5	0.818		0.26	1	1	ND	U	0.00049	1	1	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	ND	U	0.5	1	1
Pyrene	129-00-0	130	ug/L	39.5		0.075	5	5	0.265		0.2	1	1	ND	U	0.00049	1	1	0.204		0.015	0.1	1	0.326		0.022	0.1	1	ND	U	0.5	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	3.5		1.3	3	1	ND	U	0.0081	0.02	1	0.81	B	0.8	2	1	ND	U	1.3	3	1	ND	U	0.22	1	1	1.2	B	0.8	2	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-118_050907					A-118_072414					A-118_102014					A-119_050907					A-12_1252006					A-12_050707				
			Sample Date	5/9/2007					7/24/2014					10/20/2014					5/9/2007					12/5/2006					5/7/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.012	0.1	1	NA					NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.21***	0.5	1	ND	U	0.005	0.05	1	NA					ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.02	1	1	NA					NA					NA				
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.012	0.1	1	**15**		0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.19	2	1	3.8	J	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	0.61	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.012	0.1	1	160		0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.01	0.1	1	3	J	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.015	0.1	1	4.2	J	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.016	0.1	1	8.2		0.5	5	1	ND	U	0.5	3	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	ND	U	0.021	0.1	1	NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					0.105		0.012	0.1	1	ND	U	0.4	1	1	NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	0.011	0.02	1	NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	ND	U	***1.3***	3	1	NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	ND	U	0.036	0.1	1	NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.0016	3.2	1	0.12		0.012	0.1	1	ND	U	1.3	3	1	ND	U	0.0015	3	1	ND	U	0.5	1	1	ND	U	0.0005	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.0016	3.2	1	0.287		0.017	0.1	1	0.185		0.012	0.1	1	5.4		0.0015	3	1	16		0.5	1	1	24		0.005	9.9	10
Naphthalene	91-20-3	100	ug/L	ND	U	0.0016	3.2	1	ND	U	0.036	0.1	1	ND	U	0.17	2	1	ND	U	0.0015	3	1	ND	U	0.5	1	1	ND	U	0.0005	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.0016	3.2	1	0.106		0.021	0.1	1	ND	U	0.3	1	1	6.7		0.0015	3	1	1.7		0.5	1	1	4.2		0.0005	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.0016	3.2	1	0.199		0.015	0.1	1	ND	U	0.017	1	1	ND	U	0.0015	3	1	2.4		0.5	1	1	2.6		0.0005	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	1.6	B	1.3	3	1	ND	U	0.26	1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Table 7
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-12_073014					A-12_101014					A-120_1252006					A-121_1262006					A-121_050907				
			Sample Date	7/30/2014					10/10/2014					12/5/2006					12/6/2006					5/9/2007				
			Sample Matrix	WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																												
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.19	2	1	NA					NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	***0.4***	1	1	NA					NA					ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.17	2	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.22	1	1	NA					NA					NA				
Benzene	71-43-2	5	ug/L	0.25	J	0.21	0.5	1	0.27	J	0.3	1	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.3	1	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.26	1	1	14		0.5	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.2	1	1	ND	U	0.5	1	1	ND	U	0.5	1	1	0.6	J	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.26	1	1	ND	U	0.5	3	1	ND	U	0.5	3	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																												
Anthracene	120-12-7	66	ug/L	4.42		0.02	0.1	1	4.83		0.017	0.1	1	NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.39		0.012	0.1	1	0.199		0.0081	0.02	1	NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1	NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.01	0.1	1	ND	U	0.015	0.1	1	NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	0.02	0.1	1	NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	0.173		0.012	0.1	1	0.119		1.3	3	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.0015	3	1
Fluorene	86-73-7	1900	ug/L	27.6		0.017	1	1	29.6		0.3	1	1	4.6		0.5	1	1	ND	U	0.5	1	1	ND	U	0.0015	3	1
Naphthalene	91-20-3	100	ug/L	0.144		0.036	0.1	1	0.152		0.17	2	1	ND	U	0.5	1	1	ND	U	0.5	1	1	ND	U	0.0015	3	1
Phenanthrene	85-01-8	1100	ug/L	1.88		0.021	0.1	1	2.01		0.4	1	1	3		0.5	1	1	ND	U	0.5	1	1	ND	U	0.0015	3	1
Pyrene	129-00-0	130	ug/L	2.63		0.015	0.1	1	2.93		0.036	0.1	1	0.53	J	0.5	1	1	ND	U	0.5	1	1	ND	U	0.0015	3	1
Metals Dissolved																												
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	NA					ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-122_050807					A-122_072914					A-122_102014					A-133_050307					A-133_040813					A-133~JB68336				
			Sample Date	5/8/2007					7/29/2014					10/20/2014					5/3/2007					4/8/2013					6/2/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.22	1	1	NA					ND	U	0.19	2	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					-	-			-
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	0.021	0.1	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.036	0.1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	1.3	3	1	NA					ND	U	0.36	2	1	ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.17	2	1	1.2	J	0.5	5	1	ND	U	0.24	1	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.017	0.1	1	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.2	1	1	12		0.5	5	1	ND	U	0.45	2	1	0.39	J	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.5	5	1	ND	U	0.16	1	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.011	0.02	1	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.4	1	1	ND	U	0.5	5	1	ND	U	0.24	1	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	1.27		0.22	1	1	NA					ND	U	0.02	0.1	1	2.58	-	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	0.206		0.19	2	1	NA					0.173		0.012	0.1	1	**7.36**	-	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	***0.21***	0.5	1	NA					**0.269**		0.012	0.1	1	**11.1**	-	0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	0.132		0.26	1	1	NA					ND	U	0.01	0.1	1	**4.4**	-	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	ND	U	0.26	1	1	NA					ND	U	0.016	0.1	1	**6.58**	-	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00049	1	1	ND	U	0.012	0.1	1	0.182		0.21	0.5	1	**130**		0.005	10	10	0.574		0.012	0.1	1	**23.6**	-	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00049	1	1	ND	U	0.017	0.1	1	10.3		0.02	0.1	1	170		0.005	10	10	ND	U	0.017	0.1	1	8.11	-	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00049	1	1	ND	U	0.036	0.1	1	ND	U	0.19	2	1	ND	U	0.005	10	10	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00049	1	1	ND	U	0.021	0.1	1	4.2		0.26	1	1	200		0.005	10	10	ND	U	0.021	0.1	1	9.18	-	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00049	1	1	0.113		0.015	0.1	1	0.95		0.2	1	1	110		0.005	10	10	0.959		0.015	0.1	1	24.1	-	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.012	0.1	1	ND	U	0.8	0.8	1	ND	U	1.7	3	1	3.4	-	1.3	3	1

Note:
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ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-133_072414					A-133_102114					A-133_20150521_1563168					A-134_1252006					A-134_050307					A-134_072414				
			Sample Date	7/24/2014					10/21/2014					5/21/2015					12/5/2006					5/3/2007					7/24/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1	NA					NA					1.8	J	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	***0.19***	2	1	ND	U	0.01	0.0095	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.02	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.015	0.1	1	ND	U	0.5	0.5	1	NA					NA					1.1	J	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	0.38	J	0.2	1	1	ND	U	0.5	0.5	1	**24**		0.5	1	1	**50**		0.5	5	1	**7**		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.26	1	1	ND	U	0.5	0.5	1	0.85	J	0.5	1	1	1.5	J	0.5	5	1	0.62	J	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	0.6	J	0.26	1	1	0.49	J	0.26	1	1	ND	U	0.5	0.5	1	63		0.5	1	1	83		0.5	5	1	71.6		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.01	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	0.86	J	0.22	1	1	ND	U	0.5	0.5	1	9.9		0.5	1	1	13		0.5	5	1	6.8		0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.016	0.1	1	ND	U	0.5	0.5	1	18		0.5	3	1	28		0.5	5	1	15.9		0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.02	0.1	1	0.621		0.02	0.1	1	0.5		0.1	0.1	1	NA					NA					2.91		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.21		0.012	0.1	1	1.35		0.012	0.1	1	0.8		0.1	0.1	1	NA					NA					0.196		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	0.192		0.012	0.1	1	**1.18**		0.012	0.1	1	**1**		0.1	0.1	1	NA					NA					0.127		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.111		0.01	0.1	1	**1.43**		0.01	0.1	1	0.5	J	0.1	0.1	1	NA					NA					0.147		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	**0.877**		0.016	0.1	1	**0.7**		0.1	0.1	1	NA					NA					ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	0.644		0.012	0.1	1	1.19		0.012	0.1	1	**3**		0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.152		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	0.351		0.017	0.1	1	0.321		0.017	0.1	1	2		0.1	0.1	1	6.8		0.5	1	1	9		0.0005	1	1	16.7		0.017	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	0.125		0.036	0.1	1	0.1	J	0.1	0.1	1	0.69	J	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.021	0.1	1	0.195		0.021	0.1	1	0.6		0.1	0.1	1	3		0.5	1	1	3.7		0.0005	1	1	14.8		0.021	1	1
Pyrene	129-00-0	130	ug/L	1.09		0.015	0.1	1	2.09		0.015	0.1	1	3		0.1	0.1	1	8.1		0.5	1	1	ND	U	0.0005	1	1	1.42		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.21	0.5	1	0.1	J	0.082	0.082	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
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DF - Dilution factor
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-134_101314					A-135_1252006					A-135_050307					A-135_072414					A-135_101714					A-136_110308				
			Sample Date	10/13/2014					12/5/2006					5/3/2007					7/24/2014					10/17/2014					11/3/2008				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	2.4		0.021	0.1	1	NA					NA					0.86	J	0.19	2	1	1.8	J	0.016	0.1	1	ND	U	1	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.017	0.1	1	ND	U	0.01	0.0098	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.99	2.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.036	0.1	1	ND	U	1	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	2		0.01	1	1	NA					NA					ND	U	0.17	2	1	ND	U	1.3	3	1	ND	U	1	0.5	1
Benzene	71-43-2	5	ug/L	**64.6**		0.012	0.1	1	**22**		0.5	1	1	**18**		0.5	5	1	**7.1**		0.21	0.5	1	**17**		0.012	1	1	ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	3.7		0.016	0.1	1	3.1		0.5	1	1	3.1	J	0.5	5	1	1.2		0.4	1	1	2.2	J	0.015	0.1	1	ND	U	0.8	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	49.6		0.017	1	1	47		0.5	1	1	47		0.5	5	1	43.4		0.26	1	1	68.9		0.021	1	1	7		1	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.75	2.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.0081	0.02	1	ND	U	0.5	0.5	1
Toluene	108-88-3	1000	ug/L	73.5		0.012	0.1	1	21		0.5	1	1	20		0.5	5	1	6.3		0.22	1	1	17.9		0.012	1	1	ND	U	0.7	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	26.1		0.012	0.1	1	14		0.5	3	1	14		0.5	5	1	5.9		0.2	1	1	12.2		0.012	1	1	0.6	J	0.8	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	4.68		0.036	0.1	1	NA					NA					ND	U	0.02	0.1	1	0.177		0.017	1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.27		0.22	1	1	NA					NA					ND	U	0.012	0.1	1	0.128		0.011	0.02	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**0.66**		0.17	2	1	NA					NA					ND	U	0.012	0.1	1	ND	U	0.17	2	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.747		0.4	1	1	NA					NA					ND	U	0.01	0.1	1	ND	U	0.3	1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	0.225		0.0081	0.02	1	NA					NA					ND	U	0.016	0.1	1	ND	U	***0.4***	1	1	NA				
Chrysene	218-01-9	1.9	ug/L	0.731		0.3	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.012	0.1	1	0.123		1.3	3	1	**6**		1	1	1
Fluorene	86-73-7	1900	ug/L	19.6		0.26	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.389		0.017	0.1	1	0.707		0.3	1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.44	5	1	1.8		0.5	1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	0.139		0.17	2	1	NA				
Phenanthrene	85-01-8	1100	ug/L	22.5		0.2	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.122		0.021	0.1	1	0.119		0.4	1	1	7		1	1	1
Pyrene	129-00-0	130	ug/L	4.05		1.3	3	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.015	0.1	1	0.32		0.036	0.1	1	15		1	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**5.3**		0.015	1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.021	0.1	1	0.41	J	0.047	0.05	1

Note:
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Q - Qualifier
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-136_080114					A-136_101714					AOI5_A-136_012116~JC13091					A-137_11_9_2005					A-137_050707					A-137_110308				
			Sample Date	8/1/2014					10/17/2014					1/21/2016					11/9/2005					5/7/2007					11/3/2008				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	0.48	J	0.19	2	1	ND	U	0.037	0.11	1	ND	U	0.22	2	1	NA					NA					ND	U	1	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	0.016	0.11	1	ND	U	0.0083	0.019	1	ND	U	0.02	0.02	1	ND	U	0.005	0.05	1	ND	U	0.01	0.0099	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.012	0.11	1	ND	U	0.18	1	1	ND	U	1	1	1	ND	U	0.5	5	1	ND	U	1	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.013	0.11	1	ND	U	0.29	2	1	NA					NA					ND	U	1	0.5	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.018	0.11	1	ND	U	0.24	0.5	1	ND	U	1	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.011	0.11	1	ND	U	0.27	1	1	ND	U	1	1	1	ND	U	0.5	5	1	ND	U	0.8	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	19.5		0.26	1	1	8.4		0.012	0.1	1	12.6		0.23	1	1	NA					ND	U	0.5	5	1	ND	U	1	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.022	0.11	1	ND	U	0.24	1	1	4		1	1	1	0.6	J	0.5	5	1	2		0.5	0.5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.012	0.11	1	ND	U	0.16	1	1	ND	U	1	1	1	ND	U	0.5	5	1	ND	U	0.7	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	1.1		0.2	1	1	0.76	J	0.012	0.1	1	1		0.17	1	1	ND	U	1	1	1	ND	U	0.5	5	1	ND	U	0.8	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	1.28		0.021	0.11	1	1.41		0.021	1	1	0.817		0.013	0.1	1	NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.39		0.012	0.11	1	1.65		0.3	1	1	0.452		0.019	0.05	1	ND	U	0.014	0.1	1	NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**1.07**		0.013	0.11	1	**0.651**		0.4	1	1	**0.227**		0.03	0.05	1	ND	U	0.029	0.1	1	NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**1.52**		0.011	0.11	1	**1.23**		1.3	3	1	0.4		0.021	0.1	1	ND	U	0.022	0.1	1	NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**0.9**		0.016	0.11	1	**0.459**		0.036	0.1	1	0.168		0.026	0.1	1	ND	U	0.034	0.1	1	NA					NA				
Chrysene	218-01-9	1.9	ug/L	1.53		0.012	0.11	1	**2.01**		0.0081	0.02	1	0.441		0.015	0.1	1	ND	U	0.014	0.1	1	ND	U	0.00049	1	1	ND	U	1	1	1
Fluorene	86-73-7	1900	ug/L	2.79		0.018	0.11	1	3.22		0.22	1	1	2.09		0.027	0.1	1	ND	U	0.024	0.1	1	ND	U	0.00049	1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.037	0.11	1	ND	U	1.3	3	1	ND	U	0.013	0.1	1	NA					ND	U	0.00049	1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	1.24		0.022	0.11	1	2.23		0.17	2	1	0.592		0.016	0.1	1	0.2		0.03	0.1	1	ND	U	0.00049	1	1	ND	U	1	1	1
Pyrene	129-00-0	130	ug/L	7		0.016	1.1	1	4.22		0.017	1	1	1.52		0.013	0.1	1	0.2		0.021	0.1	1	ND	U	0.00049	1	1	ND	U	1	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	1.4	B	1.3	3	1	3.4		0.012	0.1	1	ND	U	2.3	3	1	ND	U	3	10	1	ND	U	0.8	0.8	1	0.17	J	0.047	0.05	1

Note:
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PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-137_040813					A-137~JB68336					A-137_071714					A-137_101514					A-137_20150521_1563168					AOI-5 A-138				
			Sample Date	4/8/2013					6/2/2014					7/17/2014					10/15/2014					5/21/2015					7/12/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.2	1	1	ND	U	0.5	0.5	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					-	-			-	NA					NA					NA									
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1	ND	U	0.01	0.0095	1	ND	U		50	
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.011	0.02	1	ND	U	0.5	0.5	1	ND	U		50	
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.36	2	1	ND	U	0.17	2	1	ND	U	0.17	2	1	ND	U	0.4	1	1	ND	U	0.5	0.5	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.24	1	1	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.22	1	1	ND	U	0.5	0.5	1	ND	U		50	
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.23	1	1	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	1.3	3	1	ND	U	0.5	0.5	1	62			50	
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.45	2	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.5	0.5	1	**17000**			1000	
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.84	J	0.16	1	1	0.43	J	0.26	1	1	0.8	J	0.26	1	1	0.89	J	0.012	0.1	1	0.7	J	0.5	0.5	1	ND	U		50	
Toluene	108-88-3	1000	ug/L	ND	U	0.23	1	1	ND	U	0.22	1	1	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.5	0.5	1	ND	U		50	
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.24	1	1	ND	U	0.2	1	1	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.5	0.5	1	280			100	
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.022	0.11	1	ND	U	0.02	0.1	1	ND	U	0.02	0.1	1	ND	U	0.21	0.5	1	ND	U	0.1	0.1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1	ND	U	0.1	0.1	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.013	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.015	0.1	1	ND	U	0.1	0.1	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.011	0.11	1	ND	U	0.01	0.1	1	ND	U	0.01	0.1	1	ND	U	0.26	1	1	ND	U	0.1	0.1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.017	0.11	1	ND	U	0.016	0.1	1	ND	U	0.016	0.1	1	ND	U	0.19	2	1	ND	U	0.1	0.1	1	NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.013	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.02	0.1	1	ND	U	0.1	0.1	1	NA				
Fluorene	86-73-7	1900	ug/L	ND	U	0.018	0.11	1	ND	U	0.017	0.1	1	ND	U	0.017	0.1	1	ND	U	0.01	0.1	1	0.1	J	0.1	0.1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.038	0.11	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	ND	U	0.012	0.1	1	ND	U	0.1	0.1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.022	0.11	1	0.245	-	0.021	0.1	1	0.31		0.021	0.1	1	0.215		0.19	2	1	0.3	J	0.1	0.1	1	NA				
Pyrene	129-00-0	130	ug/L	ND	U	0.016	0.11	1	0.138	-	0.015	0.1	1	0.153		0.015	0.1	1	0.137		0.21	0.5	1	0.3	J	0.1	0.1	1	NA				
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.7	3	1	1.9	J	1.3	3	1	ND	U	1.3	3	1	ND	U	0.017	0.1	1	0.3	J	0.082	0.082	1	NA				

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	AOI-5 A-138					A-138					A-138_040813					A-139_050707					A-139~JB68336					A-139_071814				
			Sample Date	7/16/2007					4/24/2009					4/8/2013					5/7/2007					6/2/2014					7/18/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					NA					ND	U	0.19	2	1	NA					ND	U	0.19	2	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L						NA					NA					NA					-	-			-	NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	NA					NA					ND	U	0.011	0.02	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	NA					NA					ND	U	0.26	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					NA					ND	U	0.36	2	1	NA					ND	U	0.17	2	1	ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	NA					NA					0.76	J	0.24	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	NA					NA					ND	U	0.23	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	NA					420		1	20	10	104		0.45	2	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	NA					NA					1.1		0.16	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	NA					NA					ND	U	0.23	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	NA					NA					0.33	J	0.24	1	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					ND	U	0.021	0.1	1	NA					ND	U	0.02	0.1	1	ND	U	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					0.151		0.012	0.1	1	NA					ND	U	0.012	0.1	1	ND	U	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					ND	U	0.013	0.1	1	NA					ND	U	0.012	0.1	1	ND	U	0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					0.166		0.01	0.1	1	NA					ND	U	0.01	0.1	1	ND	U	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					ND	U	0.016	0.1	1	NA					ND	U	0.016	0.1	1	ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U		0.2		NA					0.152		0.012	0.1	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U		0.62		NA					ND	U	0.017	0.1	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U		3		NA					ND	U	0.036	0.1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U		0.4		NA					0.235		0.021	0.1	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	ND	U	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U		0.2		NA					0.174		0.015	0.1	1	ND	U	0.00051	1	1	ND	U	0.015	0.1	1	ND	U	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	NA					NA					ND	U	1.7	3	1	ND	U	0.8	0.8	1	2.6	J	1.3	3	1	**5.4**		1.3	3	1

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-139_102114					A-139_20150521_1563168					A-13D_1252006					A-13D_050307					A-13D_04112011					A-13D_04112011 FILTERED				
			Sample Date	10/21/2014					5/21/2015					12/5/2006					5/3/2007					4/11/2011					4/11/2011				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.4	1	1	ND	U	0.5	0.5	1	NA					NA					ND	U	0.5	0.5	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.012	0.1	1	ND	U	0.01	0.0095	1	NA					ND	U	0.005	0.05	1	ND	U	0.01	0.0096	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.021	0.1	1	ND	U	0.5	0.5	1	NA					NA					ND	U	0.5	0.5	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.011	0.02	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.3	1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	1.3	3	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	4		0.5	0.5	1	NA				
Toluene	108-88-3	1000	ug/L	ND	U	0.017	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.036	0.1	1	ND	U	0.5	0.5	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA				
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.17	2	1	ND	U	0.1	0.1	1	NA					NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.26	1	1	ND	U	0.1	0.1	1	NA					NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.19	2	1	ND	U	0.1	0.1	1	NA					NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.26	1	1	ND	U	0.1	0.1	1	NA					NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.2	1	1	ND	U	0.1	0.1	1	NA					NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.21	0.5	1	ND	U	0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	1	1	1	NA				
Fluorene	86-73-7	1900	ug/L	ND	U	0.015	0.1	1	ND	U	0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	1	1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.016	0.1	1	ND	U	0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	1	1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.02	0.1	1	ND	U	0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	1	1	1	NA				
Pyrene	129-00-0	130	ug/L	ND	U	0.22	1	1	ND	U	0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	1	1	1	NA				
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**25.7**		0.02	0.1	1	**94.6**		0.082	0.082	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	2.6		0.052	0.052	1	ND	U	0.052	1	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-13D_07012011					A-13D_07012011 FILTERED					A-13D_53012					A-13D_082112					A-13D_11112					A-13D_32713				
			Sample Date	7/1/2011					7/1/2011					5/30/2012					8/21/2012					11/1/2012					3/27/2013				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.35	5	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					ND	U	0.012	0.014	1	NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.01	0.0097	1	NA					ND	U	0.01	0.0096	1	ND	U	0.01	0.0097	1	ND	U	***0.5***	2	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.63	1	1	ND	U	0.26	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.47	5	1	ND	U	0.36	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.24	0.5	1	ND	U	0.24	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.51	1	1	ND	U	0.23	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.5	5	1	ND	U	0.45	2	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	4		0.5	0.5	1	NA					2		0.5	0.5	1	2		0.5	0.5	1	ND	U	0.41	1	1	0.57	J	0.16	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.51	1	1	ND	U	0.23	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.58	1	1	ND	U	0.24	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					NA					0.1	J	0.1	0.1	1	ND	U	0.018	0.1	1	ND	U	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					NA					ND	U	0.1	0.1	1	ND	U	0.03	0.05	1	ND	U	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					NA					ND	U	0.1	0.1	1	ND	U	0.017	0.1	1	ND	U	0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					NA					ND	U	0.1	0.1	1	ND	U	0.024	0.05	1	ND	U	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					NA					ND	U	0.1	0.1	1	ND	U	0.038	0.1	1	ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	1	1	1	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.073	0.1	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	1	1	1	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.046	0.1	1	ND	U	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	1	1	1	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	1	1	1	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.013	0.05	1	ND	U	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	1	1	1	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.036	0.1	1	ND	U	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	0.33	J	0.08	0.08	1	ND	U	0.08	1	1	ND	U	0.08	1	1	ND	U	0.034	1	1	ND	U	2.1	5	1	ND	U	1.7	3	1

Note:
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-140_050707					A-140_040813					A-140~JB68336					A-140_071814					A-140_102114					A-140_20150521_1563168				
			Sample Date	5/7/2007					4/8/2013					6/2/2014					7/18/2014					10/21/2014					5/21/2015				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					0.39	J	0.19	2	1	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.011	0.02	1	ND	U	0.5	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					-	-			-	NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1	ND	U	0.01	0.1	1	ND	U	0.01	0.0097	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.36	2	1	ND	U	0.17	2	1	ND	U	0.17	2	1	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.24	1	1	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	1.3	3	1	ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	0.5	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.45	2	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.4	1	1	ND	U	0.5	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	0.24	J	0.16	1	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.036	0.1	1	ND	U	0.5	0.5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	0.22	1	1	ND	U	0.22	1	1	ND	U	0.021	0.1	1	ND	U	0.5	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	0.73	J	0.24	1	1	ND	U	0.2	1	1	ND	U	0.2	1	1	ND	U	0.017	0.1	1	ND	U	0.5	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.021	0.11	1	ND	U	0.02	0.1	1	ND	U	0.02	0.1	1	ND	U	0.3	1	1	ND	U	0.1	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.19	2	1	ND	U	0.1	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.013	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	***0.21***	0.5	1	ND	U	0.1	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.011	0.11	1	ND	U	0.01	0.1	1	ND	U	0.01	0.1	1	ND	U	0.2	1	1	ND	U	0.1	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.11	1	ND	U	0.016	0.1	1	ND	U	0.016	0.1	1	ND	U	0.22	1	1	ND	U	0.1	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00049	1	1	ND	U	0.012	0.11	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.26	1	1	ND	U	0.1	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00049	1	1	ND	U	0.018	0.11	1	ND	U	0.017	0.1	1	ND	U	0.017	0.1	1	ND	U	0.02	0.1	1	ND	U	0.1	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00049	1	1	ND	U	0.037	0.11	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	ND	U	0.015	0.1	1	ND	U	0.1	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00049	1	1	ND	U	0.022	0.11	1	ND	U	0.021	0.1	1	ND	U	0.021	0.1	1	ND	U	0.26	1	1	ND	U	0.1	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00049	1	1	ND	U	0.016	0.11	1	ND	U	0.015	0.1	1	ND	U	0.015	0.1	1	ND	U	0.17	2	1	ND	U	0.1	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	1.7	3	1	ND	U	1.3	3	1	2.6	B	1.3	3	1	ND	U	0.016	0.1	1	ND	U	0.082	0.082	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Summary of Groundwater Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-141_050707					A-142_071714					A-142_101514					A-143_050307					A-143_071814					A-143_101414				
			Sample Date	5/7/2007					7/17/2014					10/15/2014					5/3/2007					7/18/2014					10/14/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.26	1	1	NA					ND	U	0.19	2	1	ND	U	0.17	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.4***	1	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.012	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.17	2	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.017	0.1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.22	1	1	NA					ND	U	0.17	2	1	ND	U	0.036	0.1	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.19	2	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.3	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.3	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.021	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.022	0.11	1	26		0.5	5	1	23		0.26	1	1	ND	U	0.22	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	0.27	J	0.26	1	1	ND	U	0.21	0.5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.4	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.2	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	1.3	3	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.26	1	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.0081	0.02	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					1.42		0.02	0.1	1	ND	U	0.016	0.11	1	NA					ND	U	0.02	0.1	1	ND	U	0.2	1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					**7.42**		0.012	1	1	0.116		0.22	1	1	NA					ND	U	0.012	0.1	1	ND	U	0.015	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					**9.31**		0.012	1	1	ND	U	0.011	0.11	1	NA					ND	U	0.012	0.1	1	ND	U	0.02	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					**10.6**		0.01	1	1	0.136		0.3	1	1	NA					ND	U	0.01	0.1	1	ND	U	0.19	2	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					**3.76**		0.016	0.1	1	ND	U	0.017	0.11	1	NA					ND	U	0.016	0.1	1	ND	U	0.21	0.5	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00051	1	1	**6.94**		0.012	1	1	0.106		0.17	2	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.26	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00051	1	1	0.369		0.017	0.1	1	ND	U	0.013	0.11	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	0.132		0.19	2	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00051	1	1	0.448		0.036	0.1	1	ND	U	0.012	0.11	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.016	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00051	1	1	3.79		0.021	1	1	ND	U	0.013	0.11	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	0.22		0.21	0.5	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00051	1	1	11.8		0.015	1	1	0.169		0.4	1	1	ND	U	0.00051	1	1	ND	U	0.015	0.1	1	ND	U	0.26	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	**8.7**		1.3	3	1	ND	U	0.0081	0.02	1	ND	U	0.8	0.8	1	4.1		1.3	3	1	ND	U	0.012	1	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-145_050307					A-146_050907					A-147_050907					A-148_050807					A-148_072914					A-148_102214				
			Sample Date	5/3/2007					5/9/2007					5/9/2007					5/8/2007					7/29/2014					10/22/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					NA					NA					NA					ND	U	0.19	2	1	ND	U	1.3	3	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	0.016	0.1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					NA					NA					NA					ND	U	0.17	2	1	ND	U	0.012	0.1	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.036	0.1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.01	0.1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	3.2	J	0.5	5	1	1.3	J	0.5	5	1	0.98	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.0081	0.02	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	1.8	J	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.017	0.1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	0.7	J	0.5	5	1	2.3	J	0.5	5	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.012	0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.021	0.1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					NA					NA					ND	U	0.02	0.1	1	ND	U	0.4	1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					NA					NA					ND	U	0.012	0.1	1	ND	U	0.21	0.5	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					NA					NA					ND	U	0.012	0.1	1	ND	U	***0.26***	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					NA					NA					ND	U	0.01	0.1	1	ND	U	0.22	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					NA					NA					ND	U	0.016	0.1	1	ND	U	0.17	2	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00051	1	1	ND	U	0.0015	3	1	ND	U	0.0015	3	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.2	1	1
Fluorene	86-73-7	1900	ug/L	1.4		0.00051	1	1	9.7		0.0015	3	1	21		0.0015	3	1	2.2		0.00051	1	1	0.362		0.017	0.1	1	0.136		0.015	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00051	1	1	ND	U	0.0015	3	1	ND	U	0.0015	3	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.26	1	1
Phenanthrene	85-01-8	1100	ug/L	1.4		0.00051	1	1	5		0.0015	3	1	19		0.0015	3	1	4.2		0.00051	1	1	ND	U	0.021	0.1	1	ND	U	0.19	2	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00051	1	1	ND	U	0.0015	3	1	7.4		0.0015	3	1	2.2		0.00051	1	1	0.143		0.015	0.1	1	ND	U	0.3	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	4.5		0.8	2	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.015	0.1	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-149_050807					A-149_072914					A-149_102214					A-15_1262006					A-15_050807					A-15_102014				
			Sample Date	5/8/2007					7/29/2014					10/22/2014					12/6/2006					5/8/2007					10/20/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.021	0.1	1	NA					NA					ND	U	0.012	0.1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.0095	0.023	1	ND	U	***0.26***	1	1	NA					ND	U	0.005	0.05	1	ND	U	***0.26***	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.015	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.19	2	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.016	0.1	1	NA					NA					ND	U	0.26	1	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.012	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.01	0.1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.02	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	18		0.5	5	1	ND	U	0.26	1	1	0.76	J	0.017	0.1	1	4.7		0.5	1	1	4.1	J	0.5	5	1	0.99	J	0.012	0.1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.012	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.016	0.1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.01	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.02	0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.012	0.1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.015	0.1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	0.141		0.012	0.1	1	NA					NA					1.8		0.037	0.11	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	ND	U	0.0081	0.02	1	NA					NA					0.128		0.0081	0.02	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	***1.3***	3	1	NA					NA					ND	U	0.017	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	ND	U	0.017	0.1	1	NA					NA					ND	U	0.012	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	0.172		0.012	0.1	1	NA					NA					ND	U	0.012	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.036	0.1	1	ND	U	1	2	2	ND	U	0.0005	1	1	ND	U	0.021	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00051	1	1	0.649		0.017	0.1	1	1.68		0.017	0.1	1	21		1	2	2	18		0.0005	1	1	13		0.3	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.4	1	1	ND	U	1	2	2	ND	U	0.0005	1	1	0.217		0.17	2	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	0.199		0.021	0.1	1	13		1	2	2	8.1		0.0005	1	1	4.68		0.4	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00051	1	1	0.172		0.015	0.1	1	0.208		0.012	0.1	1	2	J	1	2	2	1.2		0.0005	1	1	0.959		1.3	3	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	0.96	B	0.8	2	1	ND	U	1.3	3	1	ND	U	0.19	2	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.2	1	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
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DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
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J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	AOI5_A-15_073115~JC522					AOI5_A-15_011916~JC12891					A-150_050807					A-150_102014					A-151_072314					A-151_102014				
			Sample Date	7/31/2015					1/19/2016					5/8/2007					10/20/2014					7/23/2014					10/20/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.22	2	1	ND	U	0.22	2	1	NA					ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.3	1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0078	0.018	1	ND	U	0.0082	0.019	1	ND	U	0.005	0.05	1	ND	U	***0.17***	2	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.18	1	1	ND	U	0.18	1	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.3	1	1	ND	U	0.021	0.1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.29	2	1	ND	U	0.29	2	1	NA					ND	U	0.26	1	1	ND	U	0.17	2	1	ND	U	0.017	0.1	1
Benzene	71-43-2	5	ug/L	ND	U	0.24	0.5	1	ND	U	0.24	0.5	1	**27**		0.5	5	1	2.9		1.3	3	1	ND	U	0.21	0.5	1	ND	U	0.4	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.27	1	1	ND	U	0.27	1	1	0.83	J	0.5	5	1	ND	U	0.22	1	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	1.5		0.23	1	1	ND	U	0.23	1	1	27		0.5	5	1	9.6		0.0081	0.02	1	ND	U	0.26	1	1	0.36	J	1.3	3	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.24	1	1	ND	U	0.24	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.26	1	1	ND	U	0.0081	0.02	1
Toluene	108-88-3	1000	ug/L	ND	U	0.16	1	1	ND	U	0.16	1	1	3.1	J	0.5	5	1	0.92	J	0.036	0.1	1	ND	U	0.22	1	1	ND	U	0.036	0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.21	J	0.17	1	1	ND	U	0.17	1	1	6.5		0.5	5	1	1.8		0.036	0.1	1	ND	U	0.2	1	1	ND	U	1.3	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	2.06		0.013	0.1	1	0.406		0.013	0.1	1	NA					ND	U	0.26	1	1	ND	U	0.02	0.1	1	ND	U	0.17	2	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.329		0.019	0.05	1	ND	U	0.019	0.05	1	NA					ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.26	1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**0.295**		0.03	0.05	1	ND	U	0.03	0.05	1	NA					ND	U	0.01	0.1	1	ND	U	0.012	0.1	1	ND	U	0.19	2	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.305		0.021	0.1	1	ND	U	0.021	0.1	1	NA					ND	U	0.015	0.1	1	ND	U	0.01	0.1	1	ND	U	0.26	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	0.209		0.026	0.1	1	ND	U	0.026	0.1	1	NA					ND	U	0.02	0.1	1	ND	U	0.016	0.1	1	ND	U	0.2	1	1
Chrysene	218-01-9	1.9	ug/L	0.313		0.015	0.1	1	ND	U	0.015	0.1	1	1.6		0.0005	1	1	ND	U	0.016	0.1	1	ND	U	0.012	0.1	1	ND	U	0.21	0.5	1
Fluorene	86-73-7	1900	ug/L	18		0.027	1	1	0.424		0.027	0.1	1	20		0.0005	1	1	0.165		0.17	2	1	0.533		0.017	0.1	1	0.243		0.26	1	1
Naphthalene	91-20-3	100	ug/L	0.308		0.013	0.1	1	ND	U	0.013	0.1	1	ND	U	0.0005	1	1	ND	U	0.012	0.1	1	ND	U	0.036	0.1	1	ND	U	0.015	0.1	1
Phenanthrene	85-01-8	1100	ug/L	3.28		0.016	0.1	1	0.132		0.016	0.1	1	16		0.0005	1	1	0.126		0.3	1	1	ND	U	0.021	0.1	1	ND	U	0.02	0.1	1
Pyrene	129-00-0	130	ug/L	1.54		0.013	0.1	1	0.434		0.013	0.1	1	3.8		0.0005	1	1	0.241		0.4	1	1	0.165		0.015	0.1	1	ND	U	0.22	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	2.3	3	1	ND	U	2.3	3	1	ND	U	0.8	0.8	1	ND	U	0.3	1	1	ND	U	1.3	3	1	ND	U	0.012	0.1	1

Note:
CAS No. - Chemical Abstract Number
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TDS - Total Dissolved Solids
mg/L - milligrams per liter
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Summary of Groundwater Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-152_050807					A-152_072314					A-152_102114					A-153_050907					A-154_050807					A-154-072214				
			Sample Date	5/8/2007					7/23/2014					10/21/2014					5/9/2007					5/8/2007					7/22/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.011	0.02	1	NA					NA					ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.01	0.1	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.012	0.1	1	NA					NA					ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	1.3	3	1	ND	U	0.5	5	1	**9**		0.5	5	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1	0.84	J	0.5	5	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.4	1	1	3.2	J	0.5	5	1	14		0.5	5	1	ND	U	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.036	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.021	0.1	1	ND	U	0.5	5	1	3.2	J	0.5	5	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.017	0.1	1	ND	U	0.5	5	1	9.6		0.5	5	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	ND	U	0.3	1	1	NA					NA					ND	U	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	ND	U	0.19	2	1	NA					NA					ND	U	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	***0.21***	0.5	1	NA					NA					ND	U	0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	ND	U	0.2	1	1	NA					NA					ND	U	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	ND	U	0.22	1	1	NA					NA					ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.26	1	1	ND	U	0.0015	3.1	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.02	0.1	1	ND	U	0.0015	3.1	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.015	0.1	1	ND	U	0.0015	3.1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	ND	U	0.26	1	1	ND	U	0.0015	3.1	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00051	1	1	ND	U	0.015	0.1	1	ND	U	0.17	2	1	ND	U	0.0015	3.1	1	ND	U	0.00051	1	1	ND	U	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.016	0.1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1

Note:
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-154_102214					A-155_073014					AOI5_A-155_012016~JC12972					A-156_112112					A-156_072814					A-156_100614				
			Sample Date	10/22/2014					7/30/2014					1/20/2016					11/21/2012					7/28/2014					10/6/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.036	0.1	1	0.28	J	0.19	2	1	ND	U	0.22	2	1	ND	U	2	2	1	ND	U	0.19	2	1	0.43	J	0.26	1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.01	0.1	1	ND	U	0.0081	0.02	1	ND	U	0.0081	0.019	1	ND	U	0.02	0.02	1	ND	U	0.0081	0.02	1	ND	U	***0.4***	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.012	0.1	1	ND	U	0.3	1	1	ND	U	0.18	1	1	ND	U	1	1	1	ND	U	0.3	1	1	ND	U	0.17	2	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.012	0.1	1	0.24	J	0.17	2	1	ND	U	0.29	2	1	ND	U	2	2	1	ND	U	0.17	2	1	ND	U	0.22	1	1
Benzene	71-43-2	5	ug/L	1.5		0.21	0.5	1	0.56		0.21	0.5	1	ND	U	0.24	0.5	1	2.2		1	1	1	ND	U	0.21	0.5	1	2.7		0.12	10	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.012	0.1	1	ND	U	0.4	1	1	ND	U	0.27	1	1	ND	U	1	1	1	ND	U	0.4	1	1	ND	U	0.3	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	0.52	J	0.4	1	1	0.55	J	0.26	1	1	0.51	J	0.23	1	1	96.2		2	2	1	ND	U	0.26	1	1	2.3		0.12	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.017	0.1	1	ND	U	0.26	1	1	ND	U	0.24	1	1	ND	U	1	1	1	ND	U	0.26	1	1	ND	U	0.2	1	1
Toluene	108-88-3	1000	ug/L	0.23	J	0.011	0.02	1	1		0.22	1	1	0.2	J	0.16	1	1	1.5		1	1	1	ND	U	0.22	1	1	0.51	J	0.2	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.021	0.1	1	1.5		0.2	1	1	1.4		0.17	1	1	4.8		1	1	1	1.2		0.2	1	1	1.4		0.12	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	1.3	3	1	4.84		0.02	0.1	1	1.21		0.013	0.1	1	16		1	1	1	1.54		0.023	0.11	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.22	1	1	**11.8**		0.012	1	1	1.69		0.019	0.05	1	**33**		1	1	1	3.37		0.013	0.11	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.17	2	1	**8.8**		0.012	1	1	**1.17**		0.03	0.05	1	**15.7**		1	1	1	**1.87**		0.014	0.11	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.4	1	1	**8.97**		0.01	1	1	**1.39**		0.021	0.1	1	**8.02**		1	1	1	**1.62**		0.011	0.11	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.011	0.02	1	**3.74**		0.016	0.1	1	**0.711**		0.026	0.1	1	**5.65**		1	1	1	**1.08**		0.017	0.11	1	NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.3	1	1	**14.7**		0.012	1	1	**1.95**		0.015	0.1	1	**57.8**		1	1	1	**5.28**		0.013	1.1	1	NA				
Fluorene	86-73-7	1900	ug/L	0.128		0.023	0.11	1	16.1		0.017	1	1	2.88		0.027	0.1	1	41.5		1	1	1	4.92		0.019	1.1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.2	1	1	ND	U	0.036	0.1	1	ND	U	0.013	0.1	1	NA					ND	U	0.039	0.11	1	NA				
Phenanthrene	85-01-8	1100	ug/L	0.177		0.26	1	1	9.56		0.021	1	1	1.41		0.016	0.1	1	65.5		1	1	1	1.26		0.023	0.11	1	NA				
Pyrene	129-00-0	130	ug/L	0.137		0.19	2	1	28.2		0.015	1	1	3.98		0.013	0.1	1	61.1		1	1	1	5.46		0.017	0.11	1	NA				
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.016	0.1	1	4.3		1.3	3	1	ND	U	2.3	3	1	**12.2**		3	3	1	**6**		1.3	3	1	ND	U	0.0081	0.02	1

Note:
CAS No. - Chemical Abstract Number
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TDS - Total Dissolved Solids
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
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DF - Dilution factor
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Summary of Groundwater Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-156_100714					A-157_112112					A-157_072914					A-157_101514					A-158_112112					A-158_072514				
			Sample Date	10/7/2014					11/21/2012					7/29/2014					10/15/2014					11/21/2012					7/25/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					7.8		2	2	1	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	2	2	1	1	J	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	NA					ND	U	0.02	0.02	1	ND	U	0.0081	0.02	1	ND	U	***0.3***	1	1	ND	U	0.02	0.02	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	NA					ND	U	1	1	1	ND	U	0.3	1	1	ND	U	0.22	1	1	ND	U	1	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	2	2	1	ND	U	0.17	2	1	ND	U	0.2	1	1	ND	U	2	2	1	0.29	J	0.17	2	1
Benzene	71-43-2	5	ug/L	NA					ND	U	1	1	1	ND	U	0.21	0.5	1	0.69		0.075	5	1	**27.1**		1	1	1	**13.4**		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	NA					2.5		1	1	1	ND	U	0.4	1	1	ND	U	0.17	2	1	2		1	1	1	1.1		0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	NA					4.4		2	2	1	ND	U	0.26	1	1	0.31	J	0.19	2	1	41		2	2	1	51.9		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	NA					ND	U	1	1	1	ND	U	0.26	1	1	ND	U	0.21	0.5	1	1.5		1	1	1	0.85	J	0.26	1	1
Toluene	108-88-3	1000	ug/L	NA					2.1		1	1	1	ND	U	0.22	1	1	ND	U	0.26	1	1	11		1	1	1	9.2		0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	NA					14		1	1	1	ND	U	0.2	1	1	0.21	J	0.21	0.5	1	15.8		1	1	1	14.4		0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	1.44		0.21	10	1	ND	U	0.1	0.1	1	ND	U	0.02	0.1	1	ND	U	0.26	1	1	20.4		1	1	1	3.14		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	3.9		0.3	1	1	ND	U	0.1	0.1	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	**11.1**		1	1	1	1.42		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**4.62**		0.4	1	1	ND	U	0.1	0.1	1	0.161		0.012	0.1	1	ND	U	0.012	0.1	1	**4.63**		0.1	0.1	1	**0.81**		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**2.81**		1.3	3	1	ND	U	0.1	0.1	1	0.2		0.01	0.1	1	ND	U	0.016	0.1	1	**4.65**		0.1	0.1	1	0.706		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**2.26**		0.36	1	1	ND	U	0.1	0.1	1	0.164		0.016	0.1	1	ND	U	0.015	0.1	1	**2.03**		0.1	0.1	1	**0.297**		0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	**9.79**		0.0081	0.02	1	ND	U	0.1	0.1	1	0.167		0.012	0.1	1	ND	U	0.01	0.1	1	**13.2**		1	1	1	1.6		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	1.41		0.22	1	1	ND	U	0.1	0.1	1	ND	U	0.017	0.1	1	ND	U	0.021	0.1	1	38.2		1	1	1	9.77		0.017	1	1
Naphthalene	91-20-3	100	ug/L	0.378		0.2	1	1	NA					ND	U	0.036	0.1	1	ND	U	0.017	0.1	1	NA					ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	0.802		0.17	2	1	ND	U	0.1	0.1	1	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	126		5	5	5	19.9		0.021	1	1
Pyrene	129-00-0	130	ug/L	5.76		0.17	1	1	0.194		0.1	0.1	1	0.205		0.015	0.1	1	ND	U	0.02	0.1	1	28.7		1	1	1	3.33		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	NA					ND	U	3	3	1	ND	U	1.3	3	1	ND	U	0.4	1	1	3		3	3	1	2.3	B	1.3	3	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-158_101514					A-159_112112					A-16_1252006					A-16_050807					A-16_072314					A-16_102214				
			Sample Date	10/15/2014					11/21/2012					12/5/2006					5/8/2007					7/23/2014					10/22/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	0.94	J	0.012	0.1	1	ND	U	10	10	5	NA					NA					ND	U	0.19	2	1	ND	U	0.4	1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.3***	1	1	ND	U	0.02	0.02	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.17	2	1	ND	U	5	5	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	0.25	J	0.016	0.1	1	ND	U	10	10	5	NA					NA					ND	U	0.17	2	1	ND	U	0.021	1	1
Benzene	71-43-2	5	ug/L	**15.1**		0.19	2	1	**30.8**		5	5	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.011	0.02	1
Ethylbenzene	100-41-4	700	ug/L	1		0.2	1	1	ND	U	5	5	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	52.4		0.26	1	1	525		10	10	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.3	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.89	J	0.01	0.1	1	ND	U	5	5	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	1.3	3	1
Toluene	108-88-3	1000	ug/L	8.6		0.26	1	1	6.6		5	5	5	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.017	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	13.5		0.21	0.5	1	14.6		5	5	5	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.036	0.1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	3.02		0.021	0.11	1	0.472		0.1	0.1	1	NA					NA					0.143		0.02	0.1	1	0.234		0.018	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1		0.012	0.11	1	ND	U	0.1	0.1	1	NA					NA					0.102		0.012	0.1	1	0.149		0.17	2	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**0.373**		0.013	0.11	1	ND	U	0.1	0.1	1	NA					NA					ND	U	0.012	0.1	1	0.131		0.3	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.391		0.011	0.11	1	ND	U	0.1	0.1	1	NA					NA					ND	U	0.01	0.1	1	0.138		0.0081	0.02	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	0.161		0.016	0.11	1	ND	U	0.1	0.1	1	NA					NA					ND	U	0.016	0.1	1	**0.279**		1.3	3	1
Chrysene	218-01-9	1.9	ug/L	1.07		0.012	0.11	1	0.125		0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.00055	1.1	1	0.107		0.012	0.1	1	0.13		0.4	1	1
Fluorene	86-73-7	1900	ug/L	7.91		0.018	0.11	1	2.6		0.1	0.1	1	1.1		0.5	1	1	ND	U	0.00055	1.1	1	1.34		0.017	0.1	1	1.54		0.2	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.22	1	1	NA					ND	U	0.5	1	1	ND	U	0.00055	1.1	1	0.147		0.036	0.1	1	ND	U	0.17	2	1
Phenanthrene	85-01-8	1100	ug/L	12.4		0.022	0.11	1	2.2		0.1	0.1	1	ND	U	0.5	1	1	ND	U	0.00055	1.1	1	0.335		0.021	0.1	1	0.453		0.22	1	1
Pyrene	129-00-0	130	ug/L	2.55		0.016	0.11	1	0.326		0.1	0.1	1	2		0.5	1	1	1.3		0.00055	1.1	1	0.911		0.015	0.1	1	0.502		0.037	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.4	1	1	ND	U	3	3	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.01	0.1	1

Note:
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-160_112112					A-161_073114					A-162_072414					A-162_101314					A-163_072314					A-163_100614				
			Sample Date	11/21/2012					7/31/2014					7/24/2014					10/13/2014					7/23/2014					10/6/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	2.8		2	2	1	**128**		0.19	2	1	ND	U	0.19	2	1	ND	U	0.4	1	1	ND	U	0.19	2	1	ND	U	0.21	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.02	0.02	1	ND	U	0.0081	0.02	1	ND	U	0.011	0.02	1	ND	U	0.012	1	1	ND	U	0.011	0.02	1	ND	U	***0.4***	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	1	1	1	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.012	1	1	ND	U	0.3	1	1	ND	U	0.17	2	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	2	2	1	17.9		0.17	2	1	ND	U	0.17	2	1	ND	U	0.021	1	1	ND	U	0.17	2	1	ND	U	0.22	1	1
Benzene	71-43-2	5	ug/L	ND	U	1	1	1	**30.3**		0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.0081	0.02	1	ND	U	0.21	0.5	1	ND	U	0.26	1	1
Ethylbenzene	100-41-4	700	ug/L	1.4		1	1	1	19		0.4	1	1	ND	U	0.4	1	1	ND	U	0.012	1	1	ND	U	0.4	1	1	ND	U	0.3	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	14.2		2	2	1	83.1		0.26	1	1	ND	U	0.26	1	1	0.48	J	0.012	0.1	1	6.6		0.26	1	1	5.1		1.3	3	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	1	1	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	1.3	3	1	ND	U	0.26	1	1	0.32	J	0.017	0.1	1
Toluene	108-88-3	1000	ug/L	2.4		1	1	1	11.7		0.22	1	1	ND	U	0.22	1	1	ND	U	0.017	1	1	ND	U	0.22	1	1	ND	U	0.2	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	8		1	1	1	40.6		0.2	1	1	ND	U	0.2	1	1	ND	U	0.036	0.1	1	ND	U	0.2	1	1	0.21	J	0.021	0.1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.611		0.1	0.1	1	0.841		0.02	0.1	1	1.16		0.025	0.13	1	0.734		1.9	20	1	0.389		0.02	0.1	1	0.529		0.0081	0.02	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.1	0.1	1	0.513		0.012	0.1	1	0.814		0.014	0.13	1	0.276		0.01	0.1	1	ND	U	0.012	0.1	1	0.139		0.22	1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.1	0.1	1	**0.507**		0.012	0.1	1	**0.47**		0.015	0.13	1	0.117		0.016	0.1	1	ND	U	0.012	0.1	1	ND	U	***0.26***	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.1	0.1	1	0.607		0.01	0.1	1	0.457		0.013	0.13	1	0.127		0.02	0.1	1	ND	U	0.01	0.1	1	0.108		0.3	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.1	0.1	1	**0.482**		0.016	0.1	1	0.225		0.02	0.13	1	ND	U	***0.3***	1	1	ND	U	0.016	0.1	1	ND	U	0.19	2	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.1	0.1	1	1.13		0.012	0.1	1	1		0.015	0.13	1	0.269		0.015	0.1	1	ND	U	0.012	0.1	1	0.146		0.17	2	1
Fluorene	86-73-7	1900	ug/L	3.34		0.1	0.1	1	13.7		0.017	1	1	0.824		0.021	0.13	1	1.77		0.012	0.1	1	4.31		0.017	1	1	4.39		0.2	1	1
Naphthalene	91-20-3	100	ug/L	NA					ND	U	0.036	0.1	1	ND	U	0.044	0.13	1	ND	U	0.22	1	1	ND	U	0.036	0.1	1	ND	U	0.021	0.14	1
Phenanthrene	85-01-8	1100	ug/L	3.6		0.1	0.1	1	7.23		0.021	1	1	ND	U	0.026	0.13	1	ND	U	0.17	2	1	0.172		0.021	0.1	1	ND	U	0.029	0.14	1
Pyrene	129-00-0	130	ug/L	0.55		0.1	0.1	1	1.85		0.015	0.1	1	1.62		0.019	0.13	1	0.696		2.6	10	1	0.24		0.015	0.1	1	0.377		0.4	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	3	3	1	2.8	B	1.3	3	1	1.7	B	1.3	3	1	3.8		2.1	5	1	ND	U	1.3	3	1	ND	U	0.0081	0.02	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Table 7
Summary of Groundwater Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-164_072314					A-164_100614					AOI5_A-166_073115~JC522					A-167_072914					A-167_102214					A-168-072214				
			Sample Date	7/23/2014					10/6/2014					7/31/2015					7/29/2014					10/22/2014					7/22/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.012	0.1	1	ND	U	0.22	2	1	ND	U	0.19	2	1	ND	U	0.015	0.1	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	***0.26***	1	1	ND	U	0.0077	0.018	1	ND	U	0.0081	0.02	1	ND	U	***0.17***	2	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.19	2	1	ND	U	0.18	1	1	ND	U	0.3	1	1	ND	U	0.2	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.26	1	1	ND	U	0.29	2	1	ND	U	0.17	2	1	ND	U	0.26	1	1	ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.01	0.1	1	ND	U	0.24	0.5	1	ND	U	0.21	0.5	1	ND	U	0.02	0.1	1	0.94		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.21	0.5	1	ND	U	0.27	1	1	ND	U	0.4	1	1	ND	U	0.22	1	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.012	0.1	1	0.47	J	0.23	1	1	ND	U	0.26	1	1	ND	U	0.016	0.1	1	3.8		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.016	0.1	1	ND	U	0.24	1	1	ND	U	0.26	1	1	ND	U	0.26	1	1	0.33	J	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.02	0.1	1	ND	U	0.16	1	1	ND	U	0.22	1	1	ND	U	0.21	0.5	1	0.83	J	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.015	0.1	1	ND	U	0.17	1	1	ND	U	0.2	1	1	ND	U	0.19	2	1	1.5		0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.231		0.02	0.1	1	ND	U	0.012	0.1	1	2.79		0.013	0.1	1	ND	U	0.02	0.1	1	ND	U	0.01	0.1	1	1		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.176		0.012	0.1	1	ND	U	0.0081	0.02	1	**6.99**		0.019	0.5	1	ND	U	0.012	0.1	1	ND	U	0.036	0.1	1	1.47		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	0.113		0.012	0.1	1	ND	U	***1.3***	3	1	**8.17**		0.03	0.5	1	ND	U	0.012	0.1	1	ND	U	0.017	1	1	**1.33**		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.105		0.01	0.1	1	ND	U	0.017	0.1	1	**3.31**		0.021	0.1	1	ND	U	0.01	0.1	1	ND	U	0.012	0.1	1	**1.9**		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	0.021	0.1	1	**3.34**		0.026	0.1	1	ND	U	0.016	0.1	1	ND	U	0.012	0.1	1	**0.961**		0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	0.368		0.012	0.1	1	ND	U	0.036	0.1	1	**15.7**		0.015	1	1	ND	U	0.012	0.1	1	ND	U	0.021	1	1	1.66		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	0.273		0.017	0.1	1	ND	U	0.4	1	1	4.82		0.027	0.1	1	ND	U	0.017	0.1	1	ND	U	0.0081	0.02	1	0.618		0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	0.183		0.012	0.1	1	0.56		0.013	0.1	1	ND	U	0.036	0.1	1	ND	U	0.4	1	1	0.299		0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.021	0.1	1	0.135		0.012	0.1	1	4.98		0.016	0.1	1	ND	U	0.021	0.1	1	ND	U	1.3	3	1	0.409		0.021	0.1	1
Pyrene	129-00-0	130	ug/L	0.575		0.015	0.1	1	0.158		0.01	0.1	1	23		0.013	1	1	ND	U	0.015	0.1	1	ND	U	0.012	0.1	1	3.82		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.2	1	1	ND	U	2.3	3	1	ND	U	1.3	3	1	ND	U	0.3	1	1	3.4		1.3	3	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-168_102214					A-169_072314					A-169_100614					A-17_11_9_2005					A-17_1262006					A-17_110308				
			Sample Date	10/22/2014					7/23/2014					10/6/2014					11/9/2005					12/6/2006					11/3/2008				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.012	0.1	1	0.27	J	0.19	2	1	0.29	J	0.2	1	1	NA					NA					ND	U	1	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.19***	2	1	ND	U	0.011	0.02	1	ND	U	0.01	0.1	1	ND	U	0.02	0.02	1	NA					ND	U	0.01	0.0097	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.02	0.1	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1	ND	U	1	1	1	ND	U	0.5	1	1	ND	U	1	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.015	0.1	1	ND	U	0.17	2	1	ND	U	0.012	0.1	1	NA					NA					ND	U	1	0.5	1
Benzene	71-43-2	5	ug/L	ND	U	0.01	0.1	1	0.53		0.21	0.5	1	0.53		0.4	1	1	ND	U	1	1	1	NA					ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.26	1	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	1	1	1	NA					ND	U	0.8	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	3.1		0.26	1	1	25.8		0.26	1	1	21.7		0.3	1	1	NA					ND	U	0.5	1	1	ND	U	1	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.71	J	0.4	1	1	ND	U	0.26	1	1	ND	U	0.021	0.1	1	ND	U	1	1	1	NA					0.7	J	0.5	0.5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.016	0.1	1	0.41	J	0.22	1	1	0.4	J	0.22	1	1	ND	U	1	1	1	NA					ND	U	0.7	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.36	J	0.011	0.02	1	1.3		0.2	1	1	1.4		0.0081	0.02	1	ND	U	1	1	1	NA					ND	U	0.8	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.012	0.1	1	1.5		0.02	0.1	1	2.16		0.17	2	1	NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.0081	0.02	1	0.383		0.012	0.1	1	0.529		0.19	2	1	ND	U	0.014	0.1	1	NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	***1.3***	3	1	0.155		0.012	0.1	1	0.198		0.21	0.5	1	ND	U	0.029	0.1	1	NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.017	1	1	0.239		0.01	0.1	1	0.276		0.2	1	1	0.2		0.022	0.1	1	NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.021	1	1	ND	U	0.016	0.1	1	ND	U	0.017	1	1	ND	U	0.034	0.1	1	NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.036	0.1	1	0.404		0.012	0.1	1	0.506		0.26	1	1	ND	U	0.014	0.1	1	ND	U	0.5	1	1	ND	U	1	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.3	1	1	9.55		0.017	1	1	8.56		0.021	0.1	1	ND	U	0.024	0.1	1	ND	U	0.5	1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.17	2	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	NA					ND	U	0.5	1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.4	1	1	6.29		0.021	1	1	8.38		0.26	1	1	ND	U	0.03	0.1	1	ND	U	0.5	1	1	ND	U	1	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.012	0.1	1	2.22		0.015	0.1	1	2.34		0.22	1	1	ND	U	0.021	0.1	1	ND	U	0.5	1	1	ND	U	1	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.21	0.5	1	ND	U	1.3	3	1	ND	U	0.016	0.1	1	ND	U	3	10	1	NA					ND	U	0.047	0.05	1

Note:
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mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-170_072314					A-170_102114					A-171_072914					A-172-072214					A-172_100914					A-173_072414				
			Sample Date	7/23/2014					10/21/2014					7/29/2014					7/22/2014					10/9/2014					7/24/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	0.27	J	0.19	2	1	ND	U	0.3	1	1	0.32	J	0.19	2	1	ND	U	0.19	2	1	ND	U	0.4	1	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	0.014	0.13	1	ND	U	0.0081	0.02	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.021	0.13	1	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.012	0.1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.044	0.13	1	ND	U	0.17	2	1	ND	U	0.17	2	1	ND	U	0.021	0.1	1	ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.4	1	1	0.33	J	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.0081	0.02	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.026	0.13	1	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	1.8		0.26	1	1	0.7	J	0.26	1	1	9.7		0.26	1	1	ND	U	0.26	1	1	ND	U	0.3	1	1	0.61	J	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.0081	0.02	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	1.3	3	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	1.3	3	1	0.41	J	0.22	1	1	ND	U	0.22	1	1	ND	U	0.017	1	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.71	J	0.2	1	1	0.51	J	0.19	2	1	2.4		0.2	1	1	ND	U	0.2	1	1	ND	U	0.036	0.1	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.473		0.02	0.1	1	0.247		0.062	0.53	1	2.05		0.02	0.1	1	ND	U	0.02	0.1	1	ND	U	0.17	2	1	ND	U	0.1	0.5	5
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.114		0.012	0.1	1	ND	U	0.21	0.5	1	1.16		0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.26	1	1	0.541		0.058	0.5	5
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.012	0.1	1	ND	U	***0.26***	1	1	**0.7**		0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.19	2	1	ND	U	0.062	0.5	5
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.118		0.01	0.1	1	ND	U	0.22	1	1	0.704		0.01	0.1	1	ND	U	0.01	0.1	1	ND	U	0.26	1	1	0.675		0.051	0.5	5
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	0.17	2	1	**0.365**		0.016	0.1	1	ND	U	0.016	0.1	1	ND	U	0.2	1	1	ND	U	0.078	0.5	5
Chrysene	218-01-9	1.9	ug/L	0.127		0.012	0.1	1	ND	U	0.2	1	1	1.9		0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.21	0.5	1	0.631		0.059	0.5	5
Fluorene	86-73-7	1900	ug/L	1		0.017	0.1	1	0.484		0.11	0.53	1	7.39		0.017	1	1	0.276		0.017	0.1	1	0.19		0.016	0.1	1	1.78		0.085	0.5	5
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.19	2	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	ND	U	0.02	0.1	1	ND	U	0.18	0.5	5
Phenanthrene	85-01-8	1100	ug/L	2.95		0.021	0.1	1	1.44		0.061	0.53	1	11.6		0.021	1	1	0.244		0.021	0.1	1	0.116		0.015	0.1	1	1.99		0.1	0.5	5
Pyrene	129-00-0	130	ug/L	0.642		0.015	0.1	1	0.281		0.065	0.53	1	2.57		0.015	0.1	1	0.111		0.015	0.1	1	ND	U	0.22	1	1	1.23		0.075	0.5	5
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.015	0.13	1	ND	U	1.3	3	1	ND	U	1.3	3	1	ND	U	0.01	0.1	1	ND	U	1.3	3	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
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Q - Qualifier
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

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Summary of Groundwater Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-173_101414					A-174_072514					A-175_072414					A-175_101414					A-177_072414					A-177_101414				
			Sample Date	10/14/2014					7/25/2014					7/24/2014					10/14/2014					7/24/2014					10/14/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.01	0.1	1	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.01	0.1	1	ND	U	0.19	2	1	ND	U	0.01	0.1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.2***	1	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1	ND	U	***0.21***	0.5	1	ND	U	0.011	0.02	1	ND	U	***0.2***	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.21	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.19	2	1	ND	U	0.17	2	1	ND	U	0.17	2	1	ND	U	0.02	0.1	1	ND	U	0.17	2	1	ND	U	0.19	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.016	0.1	1	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.016	0.1	1	ND	U	0.21	0.5	1	ND	U	0.016	0.1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.26	1	1	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	0.19	2	1	ND	U	0.4	1	1	ND	U	0.26	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.012	0.1	1	ND	U	0.26	1	1	0.27	J	0.26	1	1	ND	U	0.012	0.1	1	0.68	J	0.26	1	1	0.7	J	0.036	0.1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.015	0.1	1	ND	U	0.26	1	1	0.34	J	0.26	1	1	0.7	J	0.021	0.1	1	ND	U	0.26	1	1	ND	U	0.015	0.1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.26	1	1	ND	U	0.22	1	1	ND	U	0.22	1	1	ND	U	0.015	0.1	1	ND	U	0.22	1	1	ND	U	0.26	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.02	0.1	1	ND	U	0.2	1	1	0.43	J	0.2	1	1	1.2		0.01	0.1	1	ND	U	0.2	1	1	ND	U	0.02	0.1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.228		0.036	0.1	1	ND	U	0.02	0.1	1	6.67		0.1	0.5	5	2.49		0.012	0.1	1	1.69		0.1	0.5	5	0.566		0.016	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.036	0.1	1	ND	U	0.012	0.1	1	**6.63**		0.058	0.5	5	1.07		1.3	3	1	3.92		0.058	0.5	5	0.407		0.017	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.017	0.1	1	ND	U	0.012	0.1	1	**5.19**		0.062	0.5	5	**0.574**		0.036	0.1	1	**4.25**		0.062	0.5	5	**0.286**		0.021	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.012	0.1	1	ND	U	0.01	0.1	1	**7.17**		0.051	0.5	5	0.699		0.021	0.1	1	**5.95**		0.051	0.5	5	0.379		0.012	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1	**3.8**		0.078	0.5	5	**0.275**		0.012	0.1	1	**3.41**		0.078	0.5	5	0.188		0.012	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	**6.79**		0.059	0.5	5	0.758		0.017	0.1	1	**4.65**		0.059	0.5	5	0.346		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	2.37		0.4	1	1	0.224		0.017	0.1	1	1.63		0.085	0.5	5	3.57		0.4	1	1	4.35		0.085	0.5	5	2.32		1.3	3	1
Naphthalene	91-20-3	100	ug/L	ND	U	1.3	3	1	ND	U	0.036	0.1	1	ND	U	0.18	0.5	5	ND	U	0.012	0.1	1	0.968		0.18	0.5	5	0.182		0.0081	0.02	1
Phenanthrene	85-01-8	1100	ug/L	1.03		0.0081	0.02	1	0.105		0.021	0.1	1	1.77		0.1	0.5	5	0.277		0.011	0.02	1	2.02		0.1	0.5	5	0.424		0.036	0.1	1
Pyrene	129-00-0	130	ug/L	0.462		1.3	3	1	ND	U	0.015	0.1	1	14.6		0.075	0.5	5	2.56		0.012	0.1	1	7.72		0.075	0.5	5	0.945		0.01	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.22	1	1	ND	U	1.3	3	1	1.4	B	1.3	3	1	ND	U	0.26	1	1	2.7	B	1.3	3	1	ND	U	0.22	1	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-178_080114					A-181_072514					A-181_101014					A-182-072214					A-182_101014					A-183_072814				
			Sample Date	8/1/2014					7/25/2014					10/10/2014					7/22/2014					10/10/2014					7/28/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.22	1	1	ND	U	0.19	2	1	ND	U	0.016	0.1	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	0.011	0.02	1	ND	U	0.021	0.1	1	ND	U	0.011	0.02	1	ND	U	***0.22***	1	1	ND	U	0.0081	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.036	0.1	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.17	2	1	ND	U	1.3	3	1	ND	U	0.17	2	1	ND	U	0.21	0.5	1	ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.17	2	1	ND	U	0.21	0.5	1	ND	U	0.015	0.1	1	0.95		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	0.017	0.1	1	ND	U	0.4	1	1	ND	U	0.2	1	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.2	1	1	0.4	J	0.26	1	1	0.52	J	0.0081	0.02	1	11.3		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.02	0.1	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.22	1	1	ND	U	0.0081	0.02	1	ND	U	0.22	1	1	ND	U	0.19	2	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.2	1	1	ND	U	0.4	1	1	ND	U	0.2	1	1	ND	U	0.26	1	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	2.24		0.02	0.1	1	0.61		0.031	0.15	1	0.27		0.036	0.1	1	ND	U	0.021	0.1	1	0.421		0.02	0.1	1	ND	U	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.33		0.012	0.1	1	1.38		0.018	0.15	1	0.585		0.22	1	1	ND	U	0.012	0.1	1	0.979		0.012	0.1	1	0.764		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**1.01**		0.012	0.1	1	**1.11**		0.019	0.15	1	**0.328**		0.17	2	1	ND	U	0.012	0.1	1	**0.463**		0.012	0.1	1	**0.616**		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.01	0.1	1	**1.65**		0.016	0.15	1	0.428		0.4	1	1	ND	U	0.01	0.1	1	0.6		0.01	0.1	1	0.761		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	**2.03**		0.024	0.15	1	0.225		0.0081	0.02	1	ND	U	0.016	0.1	1	**0.316**		0.016	0.1	1	**0.626**		0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	1.88		0.012	0.1	1	1.24		0.018	0.15	1	0.398		0.3	1	1	ND	U	0.012	0.1	1	0.699		0.012	0.1	1	1.53		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	3.47		0.017	0.1	1	1.38		0.026	0.15	1	0.942		0.26	1	1	0.107		0.017	0.1	1	1.94		0.017	0.1	1	0.394		0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	0.758		0.055	0.15	1	0.235		0.21	0.5	1	ND	U	0.036	0.1	1	ND	U	0.01	0.1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	5.07		0.021	1	1	2.27		0.032	0.15	1	1.36		0.2	1	1	ND	U	0.021	0.1	1	1.62		0.021	0.1	1	ND	U	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	4.45		0.015	0.1	1	2.62		0.023	0.15	1	1.14		1.3	3	1	0.114		0.015	0.1	1	2.31		0.015	0.1	1	1.69		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**64**		6.5	15	1	2.8	B	1.3	3	1	ND	U	0.012	0.1	1	ND	U	1.3	3	1	ND	U	0.17	2	1	ND	U	1.3	3	1

Note:
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ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-184_072814					A-185_072914					A-185_100814					A-186_072314					A-186_102014					A-19D_04112011				
			Sample Date	7/28/2014					7/29/2014					10/8/2014					7/23/2014					10/20/2014					4/11/2011				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	0.63	J	0.19	2	1	ND	U	0.19	2	1	ND	U	0.19	2	1	ND	U	0.26	1	1	ND	U	0.5	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	0.0081	0.02	1	ND	U	***0.3***	1	1	ND	U	0.011	0.02	1	ND	U	***0.3***	1	1	ND	U	0.01	0.0095	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.3	1	1	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.22	1	1	ND	U	0.5	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	0.25	J	0.17	2	1	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.2	1	1	ND	U	0.5	0.5	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	ND	U	0.21	0.5	1	0.34	J	0.21	0.5	1	0.25	J	0.19	2	1	ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.4	1	1	ND	U	0.17	2	1	ND	U	0.4	1	1	ND	U	0.17	2	1	ND	U	0.5	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	0.31	J	0.26	1	1	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.021	0.1	1	ND	U	0.5	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	0.7	J	0.26	1	1	1.4		0.2	1	1	ND	U	0.26	1	1	ND	U	0.19	2	1	**43**		0.5	0.5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.22	1	1	ND	U	0.26	1	1	ND	U	0.22	1	1	ND	U	0.26	1	1	ND	U	0.5	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	4.3		0.2	1	1	0.66	J	0.2	1	1	0.25	J	0.26	1	1	ND	U	0.2	1	1	ND	U	0.21	0.5	1	ND	U	0.5	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.368		0.02	0.1	1	1.4		0.02	0.1	1	1.01		0.26	1	1	0.211		0.02	0.1	1	ND	U	0.015	0.1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.684		0.012	0.1	1	0.834		0.012	0.1	1	0.427		0.016	0.1	1	0.147		0.012	0.1	1	ND	U	0.012	0.1	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**0.606**		0.012	0.1	1	**0.438**		0.012	0.1	1	0.198		0.015	0.1	1	ND	U	0.012	0.1	1	ND	U	0.013	0.1	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.774		0.01	0.1	1	0.436		0.01	0.1	1	0.27		0.26	1	1	0.125		0.01	0.1	1	ND	U	0.01	0.1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**0.6**		0.016	0.1	1	0.176		0.016	0.1	1	0.111		0.19	2	1	ND	U	0.016	0.1	1	ND	U	0.016	0.1	1	NA				
Chrysene	218-01-9	1.9	ug/L	1.68		0.012	0.1	1	0.894		0.012	0.1	1	0.508		0.02	0.1	1	0.196		0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	1	1	1
Fluorene	86-73-7	1900	ug/L	0.441		0.017	0.1	1	2.74		0.017	0.1	1	2.19		0.012	0.1	1	0.439		0.017	0.1	1	0.226		0.22	1	1	ND	U	1	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	ND	U	0.02	0.1	1	0.227		0.036	0.1	1	ND	U	0.021	0.1	1	ND	U	1	1	1
Phenanthrene	85-01-8	1100	ug/L	0.315		0.021	0.1	1	6.26		0.021	1	1	2.91		0.01	0.1	1	0.932		0.021	0.1	1	0.349		0.17	2	1	ND	U	1	1	1
Pyrene	129-00-0	130	ug/L	1.96		0.015	0.1	1	2.31		0.015	0.1	1	1.51		0.21	0.5	1	0.595		0.015	0.1	1	0.206		0.3	1	1	ND	U	1	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	1.9	B	1.3	3	1	ND	U	1.3	3	1	ND	U	0.4	1	1	1.9	B	1.3	3	1	ND	U	0.4	1	1	0.059	J	0.052	0.052	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-19D_04112011 FILTERED					A-19D_07012011					A-19D_07012011 FILTERED					A-19D_082012					A-19D_102612					A-19D_53112				
			Sample Date	4/11/2011					7/1/2011					7/1/2011					8/20/2012					10/26/2012					5/31/2012				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	2	2	1	ND	U	0.5	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	NA					ND	U	0.01	0.0097	1	NA					ND	U	0.01	0.0097	1	ND	U	0.02	0.02	1	ND	U	0.01	0.03	1
1,2-Dichloroethane	107-06-2	5	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	1	1	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	2	2	1	ND	U	0.5	2	1
Benzene	71-43-2	5	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	1	1	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	1	1	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	2	2	1	ND	U	0.5	2	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	NA					**40**		0.5	0.5	1	NA					**53**		0.5	0.5	1	**49.8**		1	1	1	**64**		0.5	1	1
Toluene	108-88-3	1000	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	1	1	1	ND	U	0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1	ND	U	1	1	1	ND	U	0.5	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					NA					ND	U	0.1	0.09	1	ND	U	2	2	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					NA					ND	U	0.1	0.09	1	ND	U	2	2	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					NA					ND	U	0.1	0.09	1	ND	U	***2***	2	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					NA					ND	U	0.1	0.09	1	ND	U	***2***	2	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					NA					ND	U	0.1	0.09	1	ND	U	***2***	2	1	NA				
Chrysene	218-01-9	1.9	ug/L	NA					ND	U	1	1	1	NA					ND	U	0.1	0.09	1	ND	U	***2***	2	1	ND	U	0.1	0.5	1
Fluorene	86-73-7	1900	ug/L	NA					ND	U	1	1	1	NA					ND	U	0.1	0.09	1	ND	U	2	2	1	ND	U	0.1	0.5	1
Naphthalene	91-20-3	100	ug/L	NA					ND	U	1	1	1	NA					ND	U	0.1	0.09	1	NA					ND	U	0.1	0.5	1
Phenanthrene	85-01-8	1100	ug/L	NA					ND	U	1	1	1	NA					ND	U	0.1	0.09	1	ND	U	2	2	1	ND	U	0.1	0.5	1
Pyrene	129-00-0	130	ug/L	NA					ND	U	1	1	1	NA					ND	U	0.1	0.09	1	ND	U	2	2	1	ND	U	0.1	0.5	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.052	1	1	ND	U	0.08	0.08	1	ND	U	0.08	1	1	ND	U	0.034	1	1	ND	U	3	3	1	ND	U	0.08	1	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-19D_032913					A-21D_1252006					A-21D_050707					A-21D_04112011					A-21D_04112011 FILTERED					A-21D_07012011				
			Sample Date	3/29/2013					12/5/2006					5/7/2007					4/11/2011					4/11/2011					7/1/2011				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	NA					NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	NA					ND	U	0.005	0.05	1	ND	U	0.01	0.0096	1	NA					ND	U	0.01	0.0096	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.26	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.36	2	1	NA					NA					ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Benzene	71-43-2	5	ug/L	ND	U	0.24	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.23	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.45	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	**56.7**		0.16	1	1	ND	U	0.5	1	1	0.57	J	0.5	5	1	2		0.5	0.5	1	NA					2		0.5	0.5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.23	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.24	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.5	0.5	1	NA					ND	U	0.5	0.5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.02	0.1	1	NA					NA					NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.1	1	NA					NA					NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.012	0.1	1	NA					NA					NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.01	0.1	1	NA					NA					NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	NA					NA					NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	1	1	1	NA					ND	U	1	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.017	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	1	1	1	NA					ND	U	1	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	1	1	1	NA					ND	U	1	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.021	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	1	1	1	NA					ND	U	1	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.015	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	1	1	1	NA					ND	U	1	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**7.2**		1.7	3	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.052	0.052	1	ND	U	0.052	1	1	0.16	J	0.08	0.08	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-21D_07012011 FILTERED					A-21D_53012					A-21D_082112					A-21D_11112					A-21D_32913					AOI5_A-22_073115~JC522				
			Sample Date	7/1/2011					5/30/2012					8/21/2012					11/1/2012					3/29/2013					7/31/2015				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.35	5	1	ND	U	0.19	2	1	ND	U	0.22	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					ND	U	0.012	0.014	1	NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	NA					ND	U	0.01	0.0097	1	ND	U	0.01	0.0097	1	ND	U	***0.5***	2	1	ND	U	0.011	0.02	1	ND	U	0.0078	0.018	1
1,2-Dichloroethane	107-06-2	5	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.63	1	1	ND	U	0.26	1	1	ND	U	0.18	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.47	5	1	ND	U	0.36	2	1	ND	U	0.29	2	1
Benzene	71-43-2	5	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.24	0.5	1	ND	U	0.24	1	1	ND	U	0.24	0.5	1
Ethylbenzene	100-41-4	700	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.51	1	1	ND	U	0.23	1	1	ND	U	0.27	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.5	5	1	ND	U	0.45	2	1	1.4		0.23	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	NA					2		0.5	0.5	1	2		0.5	0.5	1	2.1		0.41	1	1	2.3		0.16	1	1	ND	U	0.24	1	1
Toluene	108-88-3	1000	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.51	1	1	ND	U	0.23	1	1	0.2	J	0.16	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	NA					ND	U	0.5	0.5	1	ND	U	0.5	0.5	1	ND	U	0.58	1	1	ND	U	0.24	1	1	ND	U	0.17	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					0.1	J	0.1	0.1	1	0.042	J	0.018	0.1	1	ND	U	0.02	0.1	1	1.21		0.013	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					ND	U	0.1	0.1	1	ND	U	0.03	0.05	1	ND	U	0.012	0.1	1	1.81		0.019	0.052	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					ND	U	0.1	0.1	1	ND	U	0.017	0.1	1	ND	U	0.012	0.1	1	**1.99**		0.031	0.052	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					ND	U	0.1	0.1	1	ND	U	0.024	0.05	1	ND	U	0.01	0.1	1	**2.3**		0.022	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					ND	U	0.1	0.1	1	ND	U	0.038	0.1	1	ND	U	0.016	0.1	1	**1.08**		0.027	0.1	1
Chrysene	218-01-9	1.9	ug/L	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.073	0.1	1	ND	U	0.012	0.1	1	**1.94**		0.016	0.1	1
Fluorene	86-73-7	1900	ug/L	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.046	0.1	1	ND	U	0.017	0.1	1	1.8		0.028	0.1	1
Naphthalene	91-20-3	100	ug/L	NA					ND	U	0.1	0.1	1	ND	U	0.1	0.1	1	ND	U	0.036	0.1	1	ND	U	0.036	0.1	1	ND	U	0.014	0.1	1
Phenanthrene	85-01-8	1100	ug/L	NA					0.1	J	0.1	0.1	1	0.2	J	0.1	0.1	1	0.13		0.013	0.05	1	0.173		0.021	0.1	1	ND	U	0.017	0.1	1
Pyrene	129-00-0	130	ug/L	NA					ND	U	0.1	0.1	1	0.1	J	0.1	0.1	1	0.041	J	0.036	0.1	1	ND	U	0.015	0.1	1	7.33		0.014	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.08	1	1	ND	U	0.08	1	1	ND	U	0.034	1	1	ND	U	2.1	5	1	**7.6**		1.7	3	1	2.5	B	2.3	3	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Table 7
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AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	AOI5_A-22_012116~JC13091					A-23_1252006					A-23_050807					A-23_072314					A-23_102214					A-24_072114				
			Sample Date	1/21/2016					12/5/2006					5/8/2007					7/23/2014					10/22/2014					7/21/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.22	2	1	NA					NA					ND	U	0.19	2	1	ND	U	0.02	0.1	1	1.4	J	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0086	0.02	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.3***	1	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.18	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.22	1	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.29	2	1	NA					NA					ND	U	0.17	2	1	ND	U	0.2	1	1	0.53	J	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.24	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.26	1	1	**44.4**		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.27	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.17	2	1	1.5		0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	1.1		0.23	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.015	0.1	1	40.8		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.24	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.19	2	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.16	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.26	1	1	18.6		0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.17	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.21	0.5	1	18.9		0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	1.09		0.013	0.1	1	NA					NA					ND	U	0.02	0.1	1	ND	U	0.016	0.1	1	0.825		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.43		0.019	0.05	1	NA					NA					ND	U	0.012	0.1	1	ND	U	0.017	1	1	0.26		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**1.76**		0.03	0.05	1	NA					NA					ND	U	0.012	0.1	1	ND	U	0.021	1	1	0.13		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**2.06**		0.021	0.1	1	NA					NA					0.132		0.01	0.1	1	ND	U	0.012	0.1	1	0.143		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**1.18**		0.026	0.1	1	NA					NA					ND	U	0.016	0.1	1	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	1.29		0.015	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	2.01		0.027	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.017	0.1	1	ND	U	1.3	3	1	2.81		0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.013	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.016	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.162		0.021	0.1	1	ND	U	0.036	0.1	1	2.94		0.021	0.1	1
Pyrene	129-00-0	130	ug/L	6.54		0.013	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.177		0.015	0.1	1	ND	U	0.01	0.1	1	0.765		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	2.3	3	1	0.85	B	0.8	2	1	ND	U	0.8	0.8	1	1.3	B	1.3	3	1	ND	U	0.4	1	1	**5.8**		1.3	3	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Summary of Groundwater Analytical Results
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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-24_100814					A-25_1262006					A-25_050307					A-25_072514					A-25_102014					A-26_1262006				
			Sample Date	10/8/2014					12/6/2006					5/4/2007					7/25/2014					10/20/2014					12/6/2006				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	0.49	J	0.01	0.1	1	NA					NA					ND	U	0.19	2	1	ND	U	0.038	0.11	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.21***	0.5	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.017	0.11	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.013	0.11	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.26	1	1	NA					NA					ND	U	0.17	2	1	ND	U	0.013	0.11	1	NA				
Benzene	71-43-2	5	ug/L	**18.2**		0.21	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.018	0.11	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	0.65	J	0.016	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.011	0.11	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	15.5		0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	1.3	3	1	ND	U	0.5	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.02	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	0.31	J	0.012	0.1	1	ND	U	0.5	1	1
Toluene	108-88-3	1000	ug/L	6.4		0.2	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.012	0.11	1	ND	U	0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	5.3		0.26	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.023	0.11	1	ND	U	0.5	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	1.28		0.26	1	1	NA					NA					ND	U	0.02	0.1	1	ND	U	0.011	0.02	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.05		0.26	1	1	NA					NA					ND	U	0.012	0.1	1	ND	U	0.22	1	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**1.29**		0.2	1	1	NA					NA					ND	U	0.012	0.1	1	ND	U	0.17	2	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**1.33**		0.17	2	1	NA					NA					ND	U	0.01	0.1	1	0.129		0.3	1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**0.775**		0.3	1	1	NA					NA					ND	U	0.016	0.1	1	ND	U	***0.4***	1	1	NA				
Chrysene	218-01-9	1.9	ug/L	0.808		0.22	1	1	ND	U	0.5	1.2	1	**3.1**		0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.3	1	1	ND	U	0.5	1	1
Fluorene	86-73-7	1900	ug/L	2.53		0.19	2	1	ND	U	0.5	1.2	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.2	1	1	ND	U	0.5	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.015	0.1	1	ND	U	0.5	1.2	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.26	1	1	ND	U	0.5	1	1
Phenanthrene	85-01-8	1100	ug/L	2.93		0.21	0.5	1	ND	U	0.5	1.2	1	2.4		0.00051	1	1	ND	U	0.021	0.1	1	0.109		0.17	2	1	ND	U	0.5	1	1
Pyrene	129-00-0	130	ug/L	2.34		0.4	1	1	ND	U	0.5	1.2	1	5.5		0.00051	1	1	0.163		0.015	0.1	1	0.18		0.4	1	1	ND	U	0.5	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	1.3	B	0.075	5	1	0.93	B	0.8	2	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.016	0.11	1	1.9	B	0.8	2	1

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-26_050407					A-26_072514					A-26_102014					A-27_1252006					A-27_050807					A-27-072214				
			Sample Date	5/4/2007					7/25/2014					10/20/2014					12/5/2006					5/8/2007					7/22/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.012	0.11	1	NA					NA					0.97	J	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.26***	1	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.26	1	1	NA					NA					0.52	J	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.011	0.11	1	1.5		0.5	1	1	1.7	J	0.5	5	1	1.3		0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1	0.51	J	0.5	5	1	0.67	J	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.013	0.11	1	20		0.5	1	1	26		0.5	5	1	31.8		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	1.1	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.016	0.11	1	1.9		0.5	1	1	1.7	J	0.5	5	1	0.34	J	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.021	0.11	1	4.4		0.5	1	1	5.8		0.5	5	1	4.6		0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.016	0.11	1	6.5		0.5	3	1	8.8		0.5	5	1	7.3		0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	0.269		0.26	1	1	NA					NA					0.216		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	1.13		0.17	2	1	NA					NA					0.145		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	**0.899**		0.3	1	1	NA					NA					0.122		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	**1.24**		0.26	1	1	NA					NA					0.177		0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	**0.62**		0.19	2	1	NA					NA					ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.0005	1	1	ND	U	0.012	0.1	1	1.01		0.4	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	0.203		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.0005	1	1	ND	U	0.017	0.1	1	ND	U	0.012	0.11	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	0.61		0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	0.102		0.2	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.0005	1	1	0.109		0.021	0.1	1	0.472		0.22	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	0.693		0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.0005	1	1	0.124		0.015	0.1	1	3.2		0.21	0.5	1	0.64	J	0.5	1	1	ND	U	0.00051	1	1	0.638		0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	2.6	6	2	ND	U	0.2	1	1	2		0.8	2	1	ND	U	0.8	0.8	1	**5.9**		1.3	3	1

Note:
CAS No. - Chemical Abstract Number
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TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-27_102214					A-3_1242006					A-3_050307					A-3_072414					A-3_102014					A-39_1242006				
			Sample Date	10/22/2014					12/4/2006					5/3/2007					7/24/2014					10/20/2014					12/4/2006				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	1.3	J	0.4	1	1	NA					NA					0.34	J	0.19	2	1	ND	U	0.3	1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.4***	1	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.017	0.1	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	0.71	J	1.3	3	1	NA					NA					0.18	J	0.17	2	1	ND	U	0.036	0.1	1	NA				
Benzene	71-43-2	5	ug/L	1.5		0.17	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.4	1	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	0.8	J	0.036	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.021	0.1	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	40		0.22	1	1	4.3		0.5	1	1	6.8		0.5	5	1	170		0.26	1	1	30.5		0.17	2	1	ND	U	0.5	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.29	J	0.01	0.025	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.011	0.02	1	ND	U	0.5	1	1
Toluene	108-88-3	1000	ug/L	3.9		0.4	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	1.3	3	1	ND	U	0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	8.4		0.3	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	1.5		0.2	1	1	0.31	J	0.22	1	1	ND	U	0.5	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.142		0.2	1	1	NA					NA					0.189		0.02	0.1	1	0.357		0.22	1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.21	0.5	1	NA					NA					ND	U	0.012	0.1	1	0.247		0.19	2	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	***0.26***	1	1	NA					NA					ND	U	0.012	0.1	1	ND	U	***0.22***	1	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.22	1	1	NA					NA					ND	U	0.01	0.1	1	0.123		0.26	1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.17	2	1	NA					NA					ND	U	0.016	0.1	1	ND	U	0.17	2	1	NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.2	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	0.232		0.21	0.5	1	ND	U	0.5	1	1
Fluorene	86-73-7	1900	ug/L	0.753		0.19	2	1	0.97	J	0.5	1	1	1.5		0.00051	1	1	1.77		0.017	0.1	1	3.2		1.3	3	1	ND	U	0.5	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.2	1	1	ND	U	0.5	1	1
Phenanthrene	85-01-8	1100	ug/L	0.702		0.21	0.5	1	ND	U	0.5	1	1	1.3		0.00051	1	1	2.72		0.021	0.1	1	3.93		0.26	1	1	ND	U	0.5	1	1
Pyrene	129-00-0	130	ug/L	0.264		0.26	1	1	1.1		0.5	1	1	ND	U	0.00051	1	1	0.505		0.015	0.1	1	1.26		0.2	1	1	ND	U	0.5	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.011	0.02	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	2.6	B	1.3	3	1	ND	U	0.012	0.1	1	ND	U	0.8	0.8	1

Note:
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mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-39_050707					A-39_071714					A-39_100814					A-4_071714					A-4_101514					A-40_1242006				
			Sample Date	5/7/2007					7/17/2014					10/8/2014					7/17/2014					10/15/2014					12/4/2006				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.078	0.5	1	ND	U	0.19	2	1	ND	U	0.015	0.1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.22***	1	1	ND	U	0.011	0.02	1	ND	U	***0.26***	1	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.3	1	1	ND	U	0.19	2	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.21	0.5	1	ND	U	0.17	2	1	ND	U	0.26	1	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.075	0.5	1	ND	U	0.21	0.5	1	0.27	J	0.018	0.11	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.2	1	1	ND	U	0.4	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.051	0.5	1	0.77	J	0.26	1	1	4.6		0.03	2	1	ND	U	0.5	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.1	0.5	1	ND	U	0.26	1	1	ND	U	0.02	0.1	1	0.64	J	0.5	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.19	2	1	0.25	J	0.22	1	1	0.28	J	0.012	0.11	1	3.3		0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.26	1	1	ND	U	0.2	1	1	0.98	J	0.022	0.11	1	ND	U	0.5	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	ND	U	0.059	0.5	1	ND	U	0.2	1	1	15.3		0.031	0.2	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					0.1		0.012	0.1	1	ND	U	1.3	3	1	**33**		0.12	1	1	**19.6**		0.034	2	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					0.142		0.012	0.1	1	ND	U	0.18	0.5	1	**77.2**		0.12	10	1	**13**		0.042	2	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					0.21		0.01	0.1	1	ND	U	0.1	0.5	1	**84.8**		0.1	10	1	**19**		0.025	0.2	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					0.128		0.016	0.1	1	ND	U	0.058	0.5	1	**29.4**		0.16	1	1	**7.55**		0.024	2	1	NA				
Chrysene	218-01-9	1.9	ug/L	1.1		0.00052	1	1	0.168		0.012	0.1	1	ND	U	0.085	0.5	1	**45.5**		0.12	1	1	**18.9**		0.023	2	1	ND	U	0.5	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00052	1	1	ND	U	0.017	0.1	1	ND	U	0.4	1	1	28.9		0.17	1	1	19		1.3	3	1	ND	U	0.5	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00052	1	1	ND	U	0.036	0.1	1	ND	U	0.3	1	1	ND	U	0.36	1	1	ND	U	0.016	0.1	1	ND	U	0.5	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00052	1	1	ND	U	0.021	0.1	1	ND	U	0.0081	0.02	1	62.5		0.21	10	1	38.2		0.071	0.2	1	ND	U	0.5	1	1
Pyrene	129-00-0	130	ug/L	2.2		0.00052	1	1	0.186		0.015	0.1	1	ND	U	0.062	0.5	1	**215**		0.15	10	1	45.8		0.02	0.2	1	ND	U	0.5	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.17	2	1	**30.6**		1.3	3	1	**21.8**		0.041	2	1	ND	U	0.8	0.8	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Table 7
Summary of Groundwater Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-40_050707					A-40_071714					A-40_100814					A-41_050707					A-41_072914					A-41_100814				
			Sample Date	5/7/2007					7/17/2014					10/8/2014					5/7/2007					7/29/2014					10/8/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.01	0.1	1	NA					ND	U	0.19	2	1	ND	U	0.26	1	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.26***	1	1	ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	***0.4***	1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.19	2	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.17	2	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.26	1	1	NA					ND	U	0.17	2	1	ND	U	0.22	1	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.016	0.1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.19	2	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.21	0.5	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.3	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.031	0.15	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.57	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.015	0.1	1	0.88	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.21	0.5	1
Toluene	108-88-3	1000	ug/L	0.59	J	0.5	5	1	ND	U	0.22	1	1	0.28	J	0.2	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.2	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.02	0.1	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.26	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	ND	U	0.012	0.1	1	NA					ND	U	0.02	0.1	1	ND	U	0.023	0.15	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	ND	U	***6.5***	15	1	NA					ND	U	0.012	0.1	1	ND	U	0.019	0.15	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	0.036	0.1	1	NA					ND	U	0.012	0.1	1	0.129		0.26	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	ND	U	0.021	0.1	1	NA					0.166		0.01	0.1	1	0.173		0.2	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	ND	U	0.012	0.1	1	NA					ND	U	0.016	0.1	1	ND	U	0.016	0.15	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.017	0.1	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.018	0.15	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.4	1	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.018	0.15	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.3	1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.032	0.15	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00051	1	1	0.245		0.021	0.1	1	ND	U	0.0081	0.02	1	ND	U	0.00051	1	1	0.134		0.021	0.1	1	0.116		0.21	0.5	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00051	1	1	ND	U	0.015	0.1	1	0.129		0.4	1	1	ND	U	0.00051	1	1	0.186		0.015	0.1	1	ND	U	0.024	0.15	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.2	1	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.011	0.02	1

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MDL - Method detection limit
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-43_050307					A-44_1242006					A-44_050307					A-44_071814					A-44_101414					A-47_072114				
			Sample Date	5/3/2007					12/4/2006					5/3/2007					7/18/2014					10/14/2014					7/21/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					NA					NA					ND	U	0.19	2	1	ND	U	0.011	0.02	1	ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.011	0.11	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.014	0.11	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					NA					NA					ND	U	0.17	2	1	ND	U	0.013	0.11	1	0.23	J	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	1.3	3	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.013	0.11	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.4	1	1	1.3		0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.039	0.11	1	2.7		0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.023	0.11	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.019	0.11	1	0.27	J	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					NA					NA					ND	U	0.02	0.1	1	0.463		0.013	0.11	1	2.87		0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					NA					0.187		0.012	0.1	1	0.973		1.3	3	1	4.32		0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					NA					0.145		0.012	0.1	1	**0.562**		0.039	0.11	1	**4.01**		0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					NA					0.17		0.01	0.1	1	0.803		0.023	0.11	1	**3.8**		0.01	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					NA					ND	U	0.016	0.1	1	**0.353**		0.013	0.11	1	**2.68**		0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.00053	1.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	0.203		0.012	0.1	1	0.891		0.019	0.11	1	**3.65**		0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.00053	1.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1	0.612		0.4	1	1	9.45		0.017	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.00053	1.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.3	1	1	0.216		0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00053	1.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	0.429		0.0081	0.02	1	3.76		0.021	0.1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.00053	1.1	1	1.3		0.5	1	1	ND	U	0.00051	1	1	0.431		0.015	0.1	1	2		0.014	0.11	1	6.55		0.015	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	1.9	B	0.8	2	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	**7**		1.3	3	1	ND	U	0.017	0.11	1	**8.2**		1.3	3	1

Note:
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MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
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10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-47_102214					A-48_050807					A-48_072514					A-48_101314					A-49_1252006					A-49_050807				
			Sample Date	10/22/2014					5/8/2007					7/25/2014					10/13/2014					12/5/2006					5/8/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.012	0.1	1	NA					ND	U	0.19	2	1	ND	U	0.015	0.1	1	NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.26***	1	1	0.05	J	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	***0.21***	0.5	1	NA					ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.015	0.1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.26	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	0.24	J	0.19	2	1	NA					ND	U	0.17	2	1	ND	U	0.02	0.1	1	NA					NA				
Benzene	71-43-2	5	ug/L	ND	U	0.012	0.1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	0.37	J	0.016	0.11	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.021	0.1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.012	0.1	1	60		0.5	5	1	18.8		0.26	1	1	18.4		0.021	0.1	1	4		0.5	1	1	5.5		0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	1.8		0.012	0.1	1	2.3	J	0.5	5	1	0.46	J	0.26	1	1	0.32	J	0.016	0.11	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.016	0.1	1	0.68	J	0.5	5	1	ND	U	0.22	1	1	0.33	J	0.021	0.11	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.01	0.1	1	2.1	J	0.5	5	1	1.6		0.2	1	1	2.1		0.012	0.1	1	1.2	J	0.5	3	1	1.4	J	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	12		0.021	0.1	1	NA					2.66		0.02	0.1	1	3.45		0.017	0.1	1	NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	**15.5**		0.3	1	1	NA					1.08		0.012	0.1	1	1.44		0.17	2	1	NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**10.6**		0.4	1	1	NA					**0.517**		0.012	0.1	1	**0.622**		0.3	1	1	NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**11.8**		1.3	3	1	NA					0.786		0.01	0.1	1	0.803		0.0081	0.02	1	NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**4.53**		0.036	0.1	1	NA					**0.271**		0.016	0.1	1	**0.298**		1.3	3	1	NA					NA				
Chrysene	218-01-9	1.9	ug/L	**13.4**		0.011	0.02	1	ND	U	0.0005	1	1	1.18		0.012	0.1	1	1.27		0.4	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Fluorene	86-73-7	1900	ug/L	27.4		0.22	1	1	4		0.0005	1	1	8.73		0.017	1	1	8.02		0.2	1	1	3.5		0.5	1	1	1.4		0.00051	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.021	0.1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	ND	U	0.016	0.1	1	0.59	J	0.5	1	1	1.2		0.00051	1	1
Phenanthrene	85-01-8	1100	ug/L	10.6		0.17	2	1	2.3		0.0005	1	1	12.6		0.021	1	1	7.87		0.22	1	1	2		0.5	1	1	ND	U	0.00051	1	1
Pyrene	129-00-0	130	ug/L	42.4		0.017	0.1	1	2.1		0.0005	1	1	3.46		0.015	0.1	1	3.99		0.036	0.1	1	1.8		0.5	1	1	ND	U	0.00051	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**25.5**		0.012	0.1	1	1.3	B	0.8	2	1	ND	U	1.3	3	1	ND	U	0.26	1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1

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Table 7
Summary of Groundwater Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-49_072414					A-49_102214					A-5_050407					A-5_080114					AOI5_A-5_012216~JC13164					A-6_050907				
			Sample Date	7/24/2014					10/22/2014					5/4/2007					8/1/2014					1/22/2016					5/9/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	0.45	J	0.19	2	1	ND	U	0.02	0.1	1	NA					0.42	J	0.19	2	1	ND	U	0.22	2	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	***0.17***	2	1	ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	0.0084	0.02	1	ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.2	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.18	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.26	1	1	NA					ND	U	0.17	2	1	ND	U	0.29	2	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.26	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.24	0.5	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.22	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	0.52	J	0.27	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	4.3		0.26	1	1	2.9		0.025	1.2	1	ND	U	0.5	5	1	1.5		0.26	1	1	1		0.23	1	1	0.73	J	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.19	2	1	17		0.5	5	1	ND	U	0.26	1	1	0.59	J	0.24	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.21	0.5	1	0.73	J	0.5	5	1	ND	U	0.22	1	1	0.38	J	0.16	1	1	0.82	J	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	1.2		0.2	1	1	1		0.014	0.12	1	1.1	J	0.5	5	1	0.62	J	0.2	1	1	3.5		0.17	1	1	0.9	J	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	0.686		0.02	0.1	1	0.409		0.02	1.2	1	NA					0.635		0.021	0.11	1	0.724		0.013	0.1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	0.192		0.012	0.1	1	ND	U	0.012	0.1	1	NA					1.05		0.012	0.11	1	1.33		0.019	0.05	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	0.121		0.012	0.1	1	ND	U	0.012	0.1	1	NA					**0.886**		0.013	0.11	1	**0.992**		0.03	0.05	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	0.144		0.01	0.1	1	ND	U	0.016	0.1	1	NA					1.14		0.011	0.11	1	1.13		0.021	0.1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	0.015	0.1	1	NA					**0.454**		0.016	0.11	1	**0.606**		0.026	0.1	1	NA				
Chrysene	218-01-9	1.9	ug/L	0.166		0.012	0.1	1	ND	U	0.01	0.1	1	**2.3**		0.00049	1	1	1.03		0.012	0.11	1	1.05		0.015	0.1	1	NA				
Fluorene	86-73-7	1900	ug/L	3.85		0.017	0.1	1	3.36		0.4	1	1	8.2		0.00049	1	1	1.29		0.018	0.11	1	1.18		0.027	0.1	1	NA				
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.012	0.1	1	ND	U	0.00049	1	1	ND	U	0.037	0.11	1	0.148		0.013	0.1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	1.32		0.021	0.1	1	0.815		0.014	0.035	1	5.1		0.00049	1	1	0.623		0.022	0.11	1	0.235		0.016	0.1	1	NA				
Pyrene	129-00-0	130	ug/L	0.665		0.015	0.1	1	0.388		0.043	0.12	1	9.8		0.00049	1	1	2.04		0.016	0.11	1	2.13		0.013	0.1	1	NA				
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.3	1	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	**16.1**		2.3	3	1	ND	U	0.8	0.8	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
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mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-6_073014					A-6_101714					A-8_1242006					A-8_050407					A-9_1242006					A-9_050407				
			Sample Date	7/30/2014					10/17/2014					12/4/2006					5/4/2007					12/4/2006					5/4/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.22	1	1	NA					NA					NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	0.021	1	1	NA					ND	U	0.005	0.05	1	NA					ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.036	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	1.3	3	1	NA					NA					NA					NA				
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.17	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.017	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	1.2		0.26	1	1	ND	U	0.2	1	1	0.66	J	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.3	1	1	0.96	J	0.5	1	1	1	J	0.5	5	1	16		0.5	1	1	5.1		0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.0081	0.02	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.4	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.5	3	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.021	0.11	1	ND	U	0.26	1	1	NA					NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.11	1	ND	U	0.016	0.1	1	NA					NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.013	0.11	1	ND	U	0.015	0.1	1	NA					NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.011	0.11	1	ND	U	0.26	1	1	NA					NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.11	1	ND	U	0.19	2	1	NA					NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.11	1	ND	U	0.02	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Fluorene	86-73-7	1900	ug/L	0.238		0.018	0.11	1	ND	U	0.012	0.1	1	1.3		0.5	1	1	ND	U	0.00051	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.037	0.11	1	ND	U	0.012	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Phenanthrene	85-01-8	1100	ug/L	0.128		0.022	0.11	1	ND	U	0.01	0.1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Pyrene	129-00-0	130	ug/L	0.13		0.016	0.11	1	ND	U	0.21	0.5	1	0.6	J	0.5	1	1	ND	U	0.00051	1	1	ND	U	0.5	1	1	ND	U	0.00051	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	4.9		1.3	3	1	1.9	B	0.051	0.5	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
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Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	A-9_072814					A-9_101314					A-91_050907					PZ-2_050307					PZ-3_050307					SW-2_050707				
			Sample Date	7/28/2014					10/13/2014					5/9/2007					5/3/2007					5/3/2007					5/7/2007				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.0081	0.02	1	NA					NA					NA					NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	0.012	0.1	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.021	0.1	1	NA					NA					NA					NA				
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	1.3	3	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.4	1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	1.4		0.26	1	1	2.3		0.017	0.1	1	1.2	J	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.017	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.036	0.1	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.02	0.1	1	0.117		0.036	0.1	1	NA					NA					NA					NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.1	1	0.134		0.4	1	1	NA					NA					NA					NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.012	0.1	1	ND	U	***0.22***	1	1	NA					NA					NA					NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.01	0.1	1	ND	U	0.17	2	1	NA					NA					NA					NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	***0.3***	1	1	NA					NA					NA					NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.1	1	0.146		0.0081	0.02	1	ND	U	0.0016	3.3	1	1.9		0.0005	1	1	ND	U	0.00054	1.1	1	ND	U	0.00049	1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.017	0.1	1	0.235		0.17	2	1	ND	U	0.0016	3.3	1	ND	U	0.0005	1	1	ND	U	0.00054	1.1	1	ND	U	0.00049	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.2	1	1	ND	U	0.0016	3.3	1	ND	U	0.0005	1	1	ND	U	0.00054	1.1	1	ND	U	0.00049	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.021	0.1	1	0.298		0.3	1	1	ND	U	0.0016	3.3	1	1.5		0.0005	1	1	ND	U	0.00054	1.1	1	ND	U	0.00049	1	1
Pyrene	129-00-0	130	ug/L	0.21		0.015	0.1	1	0.448		1.3	3	1	ND	U	0.0016	3.3	1	1.9		0.0005	1	1	ND	U	0.00054	1.1	1	ND	U	0.00049	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	5		0.021	0.1	1	ND	U	0.8	0.8	1	**5.8**		0.8	2	1	2.7		0.8	2	1	1.5	B	0.8	2	1

Note:
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Q - Qualifier
MDL - Method detection limit
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	SW-2_072914					SW-2_100714					SW-3_1252006					SW-3_050707					SW-3_072914					SW-3_100714				
			Sample Date	7/29/2014					10/7/2014					12/5/2006					5/7/2007					7/29/2014					10/7/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.016	0.1	1	NA					NA					ND	U	0.19	2	1	ND	U	0.014	0.11	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.0081	0.02	1	ND	U	***0.2***	1	1	NA					ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	***0.19***	2	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.023	0.11	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.19	2	1	NA					NA					ND	U	0.17	2	1	ND	U	0.017	0.11	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.015	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.013	0.11	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.26	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.26	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.01	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.013	0.11	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.02	0.1	1	2.3		0.5	1	1	1.6	J	0.5	5	1	0.33	J	0.26	1	1	0.46	J	0.3	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	0.32	J	0.0081	0.02	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.018	0.11	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.26	1	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.011	0.11	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	NA					NA					0.291		0.02	0.1	1	0.334		0.4	1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.1	1	**13.9**		0.015	0.1	1	NA					NA					0.694		0.012	0.1	1	0.856		0.21	0.5	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.013	0.1	1	**12.2**		0.02	0.1	1	NA					NA					**0.463**		0.012	0.1	1	**0.443**		0.26	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.011	0.1	1	**10.5**		0.19	2	1	NA					NA					0.522		0.01	0.1	1	0.509		0.22	1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	**8.49**		0.21	0.5	1	NA					NA					0.218		0.016	0.1	1	0.218		0.17	2	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.1	1	**20.2**		0.26	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	0.786		0.012	0.1	1	0.934		0.2	1	1
Fluorene	86-73-7	1900	ug/L	0.224		0.018	0.1	1	55.8		0.016	0.1	1	4.1		0.5	1	1	ND	U	0.0005	1	1	0.559		0.017	0.1	1	0.767		0.26	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.037	0.1	1	ND	U	0.012	0.1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	ND	U	0.024	0.11	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.022	0.1	1	ND	U	0.012	0.1	1	3.2		0.5	1	1	ND	U	0.0005	1	1	0.172		0.021	0.1	1	0.153		0.19	2	1
Pyrene	129-00-0	130	ug/L	0.118		0.016	0.1	1	24.8		0.26	1	1	ND	U	0.5	1	1	ND	U	0.0005	1	1	1.8		0.015	0.1	1	2.66		0.3	1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.22	1	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.21	0.5	1

Note:
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ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	SWR-1_072114					SWR-1_100714					SWR-2_050707					SWR2-072214					SWR-2_100714					SWR-3_1252006				
			Sample Date	7/21/2014					10/7/2014					5/7/2007					7/22/2014					10/7/2014					12/5/2006				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.26	1	1	NA					ND	U	0.19	2	1	ND	U	0.26	1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1	NA				
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.0081	0.02	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.011	0.02	1	ND	U	0.5	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.4	1	1	NA					ND	U	0.17	2	1	ND	U	0.4	1	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.2	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.2	1	1	ND	U	0.5	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	1.3	3	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	1.3	3	1	ND	U	0.5	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.21	0.5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.21	0.5	1	ND	U	0.5	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	0.22	1	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.22	1	1	ND	U	0.5	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.5	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.5	3	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.02	0.1	1	ND	U	0.19	2	1	NA					ND	U	0.02	0.1	1	ND	U	0.19	2	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	NA					ND	U	0.012	0.1	1	ND	U	0.012	0.1	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.012	0.1	1	ND	U	0.01	0.1	1	NA					ND	U	0.012	0.1	1	ND	U	0.01	0.1	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.01	0.1	1	ND	U	0.015	0.1	1	NA					ND	U	0.01	0.1	1	ND	U	0.015	0.1	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.016	0.1	1	ND	U	0.02	0.1	1	NA					0.131		0.016	0.1	1	ND	U	0.02	0.1	1	NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1	ND	U	0.016	0.1	1	**8.6**	J	5	10	10
Fluorene	86-73-7	1900	ug/L	ND	U	0.017	0.1	1	ND	U	0.012	0.1	1	0.58	J	0.00051	1	1	ND	U	0.017	0.1	1	ND	U	0.012	0.1	1	ND	U	5	10	10
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	ND	U	0.021	0.1	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1	ND	U	0.021	0.1	1	ND	U	5	10	10
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1	ND	U	0.012	0.1	1	ND	U	5	10	10
Pyrene	129-00-0	130	ug/L	ND	U	0.015	0.1	1	ND	U	0.26	1	1	ND	U	0.00051	1	1	ND	U	0.015	0.1	1	ND	U	0.26	1	1	39		5	10	10
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	1.3	3	1	ND	U	0.017	0.1	1	ND	U	0.8	0.8	1	ND	U	1.3	3	1	ND	U	0.017	0.1	1	1.5	B	0.8	2	1

Note:
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ug/L - micrograms per liter
Q - Qualifier
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	SWR-3_050707					SWR3-072214					SWR-3_100614					WP-14_050807					WP-14_040813					WP-14~JB68336				
			Sample Date	5/7/2007					7/22/2014					10/6/2014					5/8/2007					4/8/2013					6/2/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.26	1	1	NA					ND	U	0.19	2	1	ND	U	1.9	20	10
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					-	-			-
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.0081	0.02	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	3	10	10
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.4	1	1	NA					ND	U	0.36	2	1	ND	U	1.7	20	10
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.2	1	1	ND	U	0.5	5	1	ND	U	0.24	1	1	ND	U	2.1	5	10
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	1.3	3	1	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	4	10	10
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	0.55	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.21	0.5	1	ND	U	0.5	5	1	ND	U	0.45	2	1	ND	U	2.6	10	10
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.22	1	1	0.69	J	0.5	5	1	0.26	J	0.16	1	1	ND	U	2.6	10	10
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.5	5	1	ND	U	0.23	1	1	ND	U	2.2	10	10
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.5	5	1	ND	U	0.24	1	1	ND	U	2	10	10
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					ND	U	0.02	0.1	1	ND	U	0.19	2	1	NA					0.249		0.021	0.11	1	0.631	-	0.021	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					ND	U	0.012	0.1	1	0.265		0.051	0.5	1	NA					0.586		0.012	0.11	1	ND	U	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					ND	U	0.012	0.1	1	ND	U	0.02	0.1	1	NA					**0.463**		0.013	0.11	1	ND	U	0.013	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					ND	U	0.01	0.1	1	0.266		0.075	5	1	NA					0.432		0.011	0.11	1	ND	U	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					ND	U	0.016	0.1	1	ND	U	0.26	1	1	NA					**0.27**		0.016	0.11	1	ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	**6.2**		0.0005	1	1	ND	U	0.012	0.1	1	0.491		0.078	0.5	1	ND	U	0.0005	1	1	0.576		0.012	0.11	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	ND	U	0.0005	1	1	ND	U	0.017	0.1	1	0.11		0.062	0.5	1	ND	U	0.0005	1	1	0.228		0.018	0.11	1	4.94	-	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	ND	U	0.015	0.1	1	ND	U	0.0005	1	1	0.228		0.037	0.11	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	2.3		0.0005	1	1	ND	U	0.021	0.1	1	0.219		0.059	0.5	1	ND	U	0.0005	1	1	0.54		0.022	0.11	1	1.65	-	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	11		0.0005	1	1	ND	U	0.015	0.1	1	0.495		0.1	0.5	1	ND	U	0.0005	1	1	1.17		0.016	0.11	1	1.34	-	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	2.5		0.8	2	1	ND	U	1.3	3	1	ND	U	0.017	0.1	1	2.3		0.8	2	1	ND	U	1.7	3	1	2	J	1.3	3	1

Note:
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP-14_072514					WP-14_100914					WP-14_20150521_1563168					WP16-3-052605					WP16-3_050407					WP-16-3_072514				
			Sample Date	7/25/2014					10/9/2014					5/21/2015					5/26/2005					5/4/2007					7/25/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.2	1	1	ND	U	0.5	0.5	1	NA					NA					ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	0.036	0.1	1	ND	U	0.01	0.0095	1	ND	U	0.0099	0.03	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.011	0.02	1	ND	U	0.5	0.5	1	ND	U	1	5	1	ND	U	0.5	5	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.4	1	1	ND	U	0.5	0.5	1	NA					NA					ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.21	0.5	1	ND	U	0.22	1	1	ND	U	0.5	0.5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	1.3	3	1	ND	U	0.5	0.5	1	ND	U	0.8	5	1	ND	U	0.5	5	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.26	1	1	ND	U	0.26	1	1	ND	U	0.5	0.5	1	ND	U	1	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	0.32	J	0.17	2	1	ND	U	0.5	0.5	1	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	ND	U	0.3	1	1	ND	U	0.5	0.5	1	ND	U	0.7	5	1	ND	U	0.5	5	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.2	1	1	ND	U	0.17	2	1	ND	U	0.5	0.5	1	ND	U	0.8	5	1	ND	U	0.5	5	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	1.12		0.023	0.11	1	0.264		0.21	0.5	1	0.2	J	0.1	0.1	1	NA					NA					ND	U	0.02	0.1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	3.47		0.013	0.11	1	0.398		0.016	0.1	1	0.6		0.1	0.1	1	NA					NA					ND	U	0.012	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**2.18**		0.014	0.11	1	0.167		0.015	0.1	1	**0.7**		0.1	0.1	1	NA					NA					ND	U	0.012	0.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**2.96**		0.011	0.11	1	0.21		0.26	1	1	0.7		0.1	0.1	1	NA					NA					ND	U	0.01	0.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**1.2**		0.017	0.11	1	ND	U	0.21	0.5	1	**0.5**		0.1	0.1	1	NA					NA					ND	U	0.016	0.1	1
Chrysene	218-01-9	1.9	ug/L	**2.78**		0.013	0.11	1	0.269		0.02	0.1	1	0.7		0.1	0.1	1	ND	U	1	10	1	ND	U	0.00051	1	1	ND	U	0.012	0.1	1
Fluorene	86-73-7	1900	ug/L	1.16		0.019	0.11	1	0.297		0.012	0.1	1	0.1	J	0.1	0.1	1	ND	U	1	10	1	ND	U	0.00051	1	1	ND	U	0.017	0.1	1
Naphthalene	91-20-3	100	ug/L	1.03		0.039	0.11	1	0.154		0.012	0.1	1	0.2	J	0.1	0.1	1	ND	U	1	10	1	ND	U	0.00051	1	1	ND	U	0.036	0.1	1
Phenanthrene	85-01-8	1100	ug/L	1.84		0.023	0.11	1	0.345		0.01	0.1	1	0.5	J	0.1	0.1	1	ND	U	1	10	1	ND	U	0.00051	1	1	ND	U	0.021	0.1	1
Pyrene	129-00-0	130	ug/L	6.16		0.017	1.1	1	1.15		0.19	2	1	0.8		0.1	0.1	1	ND	U	1	10	1	ND	U	0.00051	1	1	ND	U	0.015	0.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	**6.2**		1.3	3	1	ND	U	0.017	0.1	1	0.97	J	0.082	0.082	1	ND	U	0.18	1	1	**12**		0.8	2	1	**24.1**		1.3	3	1

Note:
CAS No. - Chemical Abstract Number
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TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP16-3_102014					WP-4A_1242006					WP-4A_050707					WP-8_1252006					WP-8_050907					WP-8_072814				
			Sample Date	10/20/2014					12/4/2006					5/7/2007					12/5/2006					5/9/2007					7/28/2014				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.021	0.1	1	NA					NA					NA					NA					ND	U	0.19	2	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	***0.3***	1	1	NA					ND	U	0.005	0.05	1	NA					ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.22	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.3	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.2	1	1	NA					NA					NA					NA					ND	U	0.17	2	1
Benzene	71-43-2	5	ug/L	ND	U	0.26	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.17	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.4	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.015	0.1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	1.1		0.5	1	1	ND	U	0.5	5	1	0.6	J	0.26	1	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.19	2	1	ND	U	0.5	1	1	ND	U	0.5	5	1	5		0.5	1	1	3.3	J	0.5	5	1	ND	U	0.26	1	1
Toluene	108-88-3	1000	ug/L	ND	U	0.26	1	1	ND	U	0.5	1	1	ND	U	0.5	5	1	ND	U	0.5	1	1	0.79	J	0.5	5	1	ND	U	0.22	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.21	0.5	1	ND	U	0.5	3	1	ND	U	0.5	5	1	ND	U	0.5	3	1	0.91	J	0.5	5	1	ND	U	0.2	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	ND	U	0.016	0.1	1	NA					NA					NA					NA					2.86		0.024	0.12	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	ND	U	0.017	0.1	1	NA					NA					NA					NA					2.29		0.014	0.12	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	ND	U	0.021	0.1	1	NA					NA					NA					NA					**1.29**		0.015	0.12	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	ND	U	0.013	0.1	1	NA					NA					NA					NA					**1.46**		0.012	0.12	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	ND	U	0.012	0.1	1	NA					NA					NA					NA					**0.552**		0.019	0.12	1
Chrysene	218-01-9	1.9	ug/L	ND	U	0.012	0.1	1	**7.5**		2.5	6.3	5	ND	U	0.0005	1	1	**2.3**		0.5	1.2	1	NA					1.86		0.014	0.12	1
Fluorene	86-73-7	1900	ug/L	ND	U	1.3	3	1	6.9		2.5	6.3	5	ND	U	0.0005	1	1	9.5		0.5	1.2	1	NA					9.44		0.02	1.2	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.0081	0.02	1	ND	U	2.5	6.3	5	ND	U	0.0005	1	1	1.6		0.5	1.2	1	NA					ND	U	0.043	0.12	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.036	0.1	1	8.3		2.5	6.3	5	ND	U	0.0005	1	1	10		0.5	1.2	1	NA					18.4		0.025	1.2	1
Pyrene	129-00-0	130	ug/L	ND	U	0.01	0.1	1	36		2.5	6.3	5	1.9		0.0005	1	1	29		0.5	1.2	1	NA					4.61		0.018	0.12	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	ND	U	0.4	1	1	**12**		0.8	2	1	2.9		0.8	2	1	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	**34.1**		1.3	3	1

Note:
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ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
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B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
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Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP-8_100914					WP-8_101014					WP-9_050807					WP-9_072514					WP-9_100914					WP-A_11_9_2005				
			Sample Date	10/9/2014					10/10/2014					5/8/2007					7/25/2014					10/9/2014					11/9/2005				
			Sample Matrix	WG					WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																																
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.3	1	1	NA					NA					ND	U	0.19	2	1	ND	U	0.3	1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.021	0.1	1	NA					ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1	ND	U	0.02	0.02	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.036	0.1	1	NA					ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.021	0.1	1	ND	U	1	1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	1.3	3	1	NA					NA					ND	U	0.17	2	1	ND	U	0.017	0.1	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.4	1	1	NA					ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.4	1	1	ND	U	1	1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.017	0.1	1	NA					ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	1	1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	2.6		0.26	1	1	NA					ND	U	0.5	5	1	ND	U	0.26	1	1	0.26	J	0.21	0.5	1	NA				
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.011	0.02	1	NA					ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.0081	0.02	1	**21**		1	1	1
Toluene	108-88-3	1000	ug/L	0.27	J	0.2	1	1	NA					ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.036	0.1	1	ND	U	1	1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.38	J	0.26	1	1	NA					ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	1.3	3	1	ND	U	1	1	1
Semi-Volatile Organic Compounds																																
Anthracene	120-12-7	66	ug/L	NA					6.42		0.19	2	1	NA					0.619		0.02	0.1	1	0.162		0.26	1	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					**5.25**		0.012	0.1	1	NA					1.61		0.012	0.1	1	0.519		0.016	0.1	1	**14.7**		0.014	1.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					**3.1**		0.01	0.1	1	NA					**1.75**		0.012	0.1	1	**0.481**		0.015	1	1	**13.4**		0.029	1.1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					**3.93**		0.015	0.1	1	NA					**2.38**		0.01	0.1	1	0.754		0.26	1	1	**17.9**		0.022	1.1	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					**1.25**		0.02	0.1	1	NA					**1.29**		0.016	0.1	1	**0.401**		0.19	2	1	**18.1**		0.034	1.1	1
Chrysene	218-01-9	1.9	ug/L	NA					**4.83**		0.016	0.1	1	ND	U	0.00061	1.2	1	1.56		0.012	0.1	1	0.404		0.02	0.1	1	**9**		0.014	1.1	1
Fluorene	86-73-7	1900	ug/L	NA					20.3		0.012	0.1	1	ND	U	0.00061	1.2	1	0.74		0.017	0.1	1	0.277		0.012	1	1	38.2		0.024	1.1	1
Naphthalene	91-20-3	100	ug/L	NA					ND	U	0.17	2	1	ND	U	0.00061	1.2	1	0.966		0.036	0.1	1	0.118		0.012	1	1	NA				
Phenanthrene	85-01-8	1100	ug/L	NA					43.5		0.012	0.1	1	ND	U	0.00061	1.2	1	1.94		0.021	0.1	1	0.492		0.01	0.1	1	13.2		0.03	1.1	1
Pyrene	129-00-0	130	ug/L	NA					10.5		0.26	1	1	ND	U	0.00061	1.2	1	2.72		0.015	0.1	1	0.787		0.21	0.5	1	51.5		0.021	1.1	1
Metals Dissolved																																
Lead	7439-92-1	5	ug/L	NA					**21.3**		0.21	0.5	1	ND	U	0.8	0.8	1	2.5	B	1.3	3	1	ND	U	0.012	0.1	1	ND	U	3	10	1

Note:
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Q - Qualifier
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP-A_050707					WP-A-073114					AOI5_WPA_012116~JC13091					WP-B_050307				
			Sample Date	5/7/2007					7/31/2014					1/21/2016					5/3/2007				
			Sample Matrix	WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																							
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					ND	U	0.19	2	1	ND	U	0.22	2	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.0081	0.02	1	ND	U	0.0083	0.019	1	ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.18	1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					ND	U	0.17	2	1	ND	U	0.29	2	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.21	0.5	1	ND	U	0.24	0.5	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.27	1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.23	1	1	1.8	J	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	0.62	J	0.5	5	1	ND	U	0.26	1	1	ND	U	0.24	1	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.16	1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	0.17	1	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																							
Anthracene	120-12-7	66	ug/L	NA					6.75		0.1	0.5	1	0.72		0.014	0.11	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					**9.79**		0.058	0.5	1	1.62		0.02	0.054	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					**18.5**		0.062	0.5	1	**2.26**		0.032	0.054	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					**18.2**		0.051	0.5	1	**2.21**		0.023	0.11	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					**23.8**		0.078	0.5	1	**2.65**		0.028	0.11	1	NA				
Chrysene	218-01-9	1.9	ug/L	**3.6**		0.00049	1	1	**23.4**		0.059	0.5	1	**2.99**		0.016	0.11	1	**12**		0.005	9.9	10
Fluorene	86-73-7	1900	ug/L	ND	U	0.00049	1	1	2.34		0.085	0.5	1	0.133		0.029	0.11	1	ND	U	0.005	9.9	10
Naphthalene	91-20-3	100	ug/L	ND	U	0.00049	1	1	ND	U	0.18	0.5	1	ND	U	0.014	0.11	1	ND	U	0.005	9.9	10
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.00049	1	1	1.83		0.1	0.5	1	0.153		0.017	0.11	1	ND	U	0.005	9.9	10
Pyrene	129-00-0	130	ug/L	11		0.00049	1	1	65.2		0.075	5	1	8.73		0.014	1.1	1	23		0.005	9.9	10
Metals Dissolved																							
Lead	7439-92-1	5	ug/L	1.5	B	0.8	2	1	3.9		1.3	3	1	ND	U	2.3	3	1	1.7	B	0.8	2	1

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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

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Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP-C_050307					WP-D_050307					WRD_072314					WP-D_100814					WP-E_050307				
			Sample Date	5/3/2007					5/3/2007					7/23/2014					10/8/2014					5/3/2007				
			Sample Matrix	WG					WG					WG					WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds																												
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	NA					NA					ND	U	0.19	2	1	ND	U	0.4	1	1	NA				
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA					NA					NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.005	0.05	1	ND	U	0.005	0.05	1	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1	ND	U	0.005	0.05	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.3	1	1	ND	U	0.021	0.1	1	ND	U	0.5	5	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	NA					NA					ND	U	0.17	2	1	ND	U	0.017	0.1	1	NA				
Benzene	71-43-2	5	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.21	0.5	1	0.22	J	0.19	2	1	ND	U	0.5	5	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.4	1	1	ND	U	0.012	0.1	1	ND	U	0.5	5	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	2	J	0.5	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.3	1	1	1.6	J	0.5	5	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.26	1	1	ND	U	0.011	0.02	1	ND	U	0.5	5	1
Toluene	108-88-3	1000	ug/L	ND	U	0.5	5	1	ND	U	0.5	5	1	ND	U	0.22	1	1	ND	U	0.036	0.1	1	ND	U	0.5	5	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.95	J	0.5	5	1	ND	U	0.5	5	1	ND	U	0.2	1	1	ND	U	1.3	3	1	ND	U	0.5	5	1
Semi-Volatile Organic Compounds																												
Anthracene	120-12-7	66	ug/L	NA					NA					ND	U	0.02	0.1	1	ND	U	0.17	2	1	NA				
Benzo(a)Anthracene	56-55-3	4.9	ug/L	NA					NA					0.211		0.012	0.1	1	0.291		0.02	0.1	1	NA				
Benzo(a)Pyrene	50-32-8	0.2	ug/L	NA					NA					**8**		0.012	0.1	1	**0.269**		0.26	1	1	NA				
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	NA					NA					0.323		0.01	0.1	1	0.302		0.21	0.5	1	NA				
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	NA					NA					0.252		0.016	0.1	1	0.168		0.26	1	1	NA				
Chrysene	218-01-9	1.9	ug/L	ND	U	0.0005	1	1	ND	U	0.0005	1	1	0.25		0.012	0.1	1	0.23		0.19	2	1	**3.4**		0.0005	1	1
Fluorene	86-73-7	1900	ug/L	1.1		0.0005	1	1	ND	U	0.0005	1	1	ND	U	0.017	0.1	1	ND	U	0.2	1	1	ND	U	0.0005	1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.0005	1	1	ND	U	0.0005	1	1	ND	U	0.036	0.1	1	ND	U	0.26	1	1	ND	U	0.0005	1	1
Phenanthrene	85-01-8	1100	ug/L	ND	U	0.0005	1	1	ND	U	0.0005	1	1	ND	U	0.021	0.1	1	ND	U	0.22	1	1	ND	U	0.0005	1	1
Pyrene	129-00-0	130	ug/L	ND	U	0.0005	1	1	ND	U	0.0005	1	1	0.419		0.015	0.1	1	0.575		0.2	1	1	7		0.0005	1	1
Metals Dissolved																												
Lead	7439-92-1	5	ug/L	ND	U	0.8	0.8	1	ND	U	0.8	0.8	1	2.2	B	1.3	3	1	ND	U	0.012	0.1	1	ND	U	0.8	0.8	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NA - Not analyzed

PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 7
Summary of Groundwater Analytical Results
AOI 5 Remedial Investigation Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs	Sample ID	WP-E_072414					WP-E_101714				
			Sample Date	7/24/2014					10/17/2014				
			Sample Matrix	WG					WG				
			Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
Volatile Organic Compounds													
1,2,4-Trimethylbenzene	95-63-6	62	ug/L	ND	U	0.19	2	1	ND	U	0.0081	0.02	1
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	ug/L	NA					NA				
1,2-Dibromoethane (EDB)	106-93-4	0.05	ug/L	ND	U	0.011	0.02	1	ND	U	0.012	0.1	1
1,2-Dichloroethane	107-06-2	5	ug/L	ND	U	0.3	1	1	ND	U	0.017	0.1	1
1,3,5-Trimethylbenzene	108-67-8	1200	ug/L	ND	U	0.17	2	1	ND	U	0.036	0.1	1
Benzene	71-43-2	5	ug/L	0.51		0.21	0.5	1	0.39	J	0.015	0.1	1
Ethylbenzene	100-41-4	700	ug/L	ND	U	0.4	1	1	ND	U	0.021	0.1	1
Isopropylbenzene (Cumene)	98-82-8	3500	ug/L	3.2		0.26	1	1	7.5		0.17	2	1
Methyl Tertiary Butyl Ether	1634-04-4	20	ug/L	ND	U	0.26	1	1	ND	U	1.3	3	1
Toluene	108-88-3	1000	ug/L	ND	U	0.22	1	1	0.3	J	0.02	0.1	1
Xylenes, Total (Dimethylbenzene)	1330-20-7	10000	ug/L	0.67	J	0.2	1	1	2		0.3	1	1
Semi-Volatile Organic Compounds													
Anthracene	120-12-7	66	ug/L	0.885		0.02	0.1	1	2.18		0.22	1	1
Benzo(a)Anthracene	56-55-3	4.9	ug/L	1.43		0.012	0.1	1	**5.8**		0.02	0.1	1
Benzo(a)Pyrene	50-32-8	0.2	ug/L	**1.38**		0.012	0.1	1	**6.96**		0.26	1	1
Benzo(b)Fluoranthene	205-99-2	1.2	ug/L	**1.33**		0.01	0.1	1	**3.04**		0.21	0.5	1
Benzo(g,h,i)Perylene	191-24-2	0.26	ug/L	**0.961**		0.016	0.1	1	**4.2**		0.26	1	1
Chrysene	218-01-9	1.9	ug/L	1.45		0.012	0.1	1	**17.4**		0.19	2	1
Fluorene	86-73-7	1900	ug/L	0.626		0.017	0.1	1	8.95		0.016	0.1	1
Naphthalene	91-20-3	100	ug/L	ND	U	0.036	0.1	1	0.477		0.01	0.1	1
Phenanthrene	85-01-8	1100	ug/L	0.471		0.021	0.1	1	8.07		0.015	0.1	1
Pyrene	129-00-0	130	ug/L	2.21		0.015	0.1	1	18.1		0.2	1	1
Metals Dissolved													
Lead	7439-92-1	5	ug/L	**12.9**		1.3	3	1	ND	U	0.012	0.1	1

Note:
CAS No. - Chemical Abstract Number
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
mg/L - milligrams per liter
MSC - Medium Specific Concentrations
ug/L - micrograms per liter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
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PADEP Act 2 Non-Residental Used Aquifer TDS <2500 ug/l (last updated August 27, 2016).

Qualifiers:
U - Compound analyzed but not detected
J - Compound detected between the RL and MDL. Result should be considered an estimate
B - Compound found in blank

Exceedances:
10 - Result exceeds PADEP Non-residential Used Aquifer TDS <2500 ug/l
15 - MDL exceeds either PADEP Non-residential Used Aquifer TDS <2500 ug/l

Table 8
Summary of Indoor Air Quality Analytical Results
AOI 5 Remedial Investigations Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Analyte	CAS Number	PADEP VI	1/10th PADEP VI	OSHA PEL TWA	EPA RSL Cancer Risk = 10^{-5} HQ = 0.1	EPA RSL Cancer Risk = 10^{-6} HQ = 0.1	NIOSH RELs	ACGIH TLVs	Location	B&S Office Building					B&S Office Building, Outside					Wharf on Building Dock, Outside					Control Room				
									Sample	Sample 1					Sample 2					AOI5-AA-16-001					AOI5-AI-16-001				
									Date	10/24/2012					10/24/2012					3/28/2016					3/28/2016				
									Collected By	Stantec					Stantec					GHD					GHD				
									Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
1,2,4-Trimethylbenzene	95-63-6	31	3.1	NS	26	26	125,000	123,000	ug/m3	1.5		0.85		1.69	1.3		1.1		2.27	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1
1,2-Dibromoethane	106-93-4	0.2	0.02	153,700	0.2	0.02	346	NS	ug/m3	ND		***0.85***		1.69	ND		***1.1***		2.27	ND	U	***1.5***	***7.7***	1	ND	U	***1.5***	***7.7***	1
1,2-Dichloroethane	107-06-2	4.7	0.47	202,400	4.7	0.47	4,000	40,500	ug/m3	ND	U	***0.85***		1.69	ND	U	***1.1***		2.27	ND	U	***0.81***	***4***	1	ND	U	***0.81***	***4***	1
1,3,5-Trimethylbenzene	108-67-8	31	3.1	NS	26	26	125,000	123,000	ug/m3	ND	U	0.85		1.69	ND	U	1.1		2.27	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1
Benzene	71-43-2	16	1.6	3,190	16	1.6	319	1,600	ug/m3	4.3		0.85		1.69	3.9		1.1		2.27	2.4	J	0.64	***3.2***	1	1.4	J	0.64	***3.2***	1
Ethylbenzene	100-41-4	49	4.9	435,000	49	4.9	435,000	86,800	ug/m3	1.3		0.85		1.69	ND	U	1.1		2.27	1.6	J	0.87	4.3	1	1.3	J	0.87	4.3	1
Isopropyl Benzene (Cumene)	98-82-8	1,800	180	245,000	180	180	245,000	246,000	ug/m3	2.1		0.85		1.69	2.0		1.1		2.27	2.5	J	0.98	4.9	1	9.8		0.98	4.9	1
Methyl Tert-Butyl Ether	1634-04-4	470	47	NS	470	47	NS	180,000	ug/m3	ND	U	0.85		1.69	ND	U	1.1		2.27	ND	U	0.72	3.6	1	ND	U	0.72	3.6	1
Naphthalene	91-20-3	3.6	0.36	50,000	3.6	0.36	50,000	52,000	ug/m3	NA					NA					ND	U	***2.6***	***5.2***	1	ND	U	***2.6***	***5.2***	1
Toluene	108-88-3	22,000	2,200	754,000	2,200	2,200	375,000	75,400	ug/m3	7.4		0.85		1.69	6.5		1.1		2.27	1.7	J	0.75	3.8	1	3.1	J	0.75	3.8	1
Total Xylenes	1330-20-7	440	44	435,000	44	44	435,000	434,000	ug/m3	6.1		1.7		1.69	5.1		2.3		2.27	2.5	J	0.87	4.3	1	4.9	J	0.87	4.3	1

Note:
PADEP VI- Pennsylvania Department of Environmental Protection Vapor intrusion Screening Value. Indoor Air Statewide Health Standard Non-Residential Vapor Intrusion Screening Level (January 2017).
OSHA PEL TWA - Occupational Safety and Health Administration Time-Weighted Average Permissible Exposure Limit .
EPA RSL - United States Environmental Protection Agency Industrial Regional Screening Level.
HQ - Hazard Quotient
NIOSH RELs - National Institute for Occupational Safety and Health Recommended Exposure Limits.
ACGIH TLVs - American Conference of Governmental Industrial Hygienists Threshold Limit Value.
The RSL for 1,2,4 and 1,3,5- trimethylbenzene were calculated using the September 2016 final IRIS RfC.
OSHA PELs, NIOSH RELs, and ACGIH TLVs from GHD's Air Data Evaluation Letter (Reference No. 11109626), November 9, 2016.
CAS - Chemical Abstract Registry Number
ug/m3 - Micrograms per cubic meter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NS - No standard
NA - Not analyzed

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

Exceedances:
10 - Result exceeds PA VI
10 - Result exceeds 1/10th PA VI
10 - Result exceeds OSHA PEL TWA
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-5)
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-6)
10 - Result exceeds NIOSH REL
10 - Result exceeds ACGIH TLVs
15 - MDL exceeds standard

Table 8
Summary of Indoor Air Quality Analytical Results
AOI 5 Remedial Investigations Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Analyte	CAS Number	PADEP VI	1/10th PADEP VI	OSHA PEL TWA	EPA RSL Cancer Risk = 10^{-5} HQ = 0.1	EPA RSL Cancer Risk = 10^{-6} HQ = 0.1	NIOSH RELs	ACGIH TLVs	Location	Dock Wharf Office, 2nd Floor					Dock Wharf Office, 1st Floor					Dock Office				
									Sample	AOI5-AI-16-002					AOI5-AI-16-003					AOI5-AI-16-004				
									Date	3/28/2016					3/28/2016					3/28/2016				
									Collected By	GHD					GHD					GHD				
									Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
1,2,4-Trimethylbenzene	95-63-6	31	3.1	NS	26	26	125,000	123,000	ug/m3	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1
1,2-Dibromoethane	106-93-4	0.2	0.02	153,700	0.2	0.02	346	NS	ug/m3	ND	U	***1.5***	***7.7***	1	ND	U	***1.5***	***7.7***	1	ND	U	***1.5***	***7.7***	1
1,2-Dichloroethane	107-06-2	4.7	0.47	202,400	4.7	0.47	4,000	40,500	ug/m3	ND	U	***0.81***	***4***	1	ND	U	***0.81***	***4***	1	ND	U	***0.81***	***4***	1
1,3,5-Trimethylbenzene	108-67-8	31	3.1	NS	26	26	125,000	123,000	ug/m3	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1	ND	U	0.98	***4.9***	1
Benzene	71-43-2	16	1.6	3,190	16	1.6	319	1,600	ug/m3	4.3		0.64	***3.2***	1	2.6	J	0.64	***3.2***	1	4.4		0.64	***3.2***	1
Ethylbenzene	100-41-4	49	4.9	435,000	49	4.9	435,000	86,800	ug/m3	ND	U	0.87	4.3	1	1.2	J	0.87	4.3	1	1.1	J	0.87	4.3	1
Isopropyl Benzene (Cumene)	98-82-8	1,800	180	245,000	180	180	245,000	246,000	ug/m3	18		0.98	4.9	1	8.6		0.98	4.9	1	ND	U	0.98	4.9	1
Methyl Tert-Butyl Ether	1634-04-4	470	47	NS	470	47	NS	180,000	ug/m3	ND	U	0.72	3.6	1	ND	U	0.72	3.6	1	ND	U	0.72	3.6	1
Naphthalene	91-20-3	3.6	0.36	50,000	3.6	0.36	50,000	52,000	ug/m3	ND	U	***2.6***	***5.2***	1	ND	U	***2.6***	***5.2***	1	ND	U	***2.6***	***5.2***	1
Toluene	108-88-3	22,000	2,200	754,000	2,200	2,200	375,000	75,400	ug/m3	5		0.75	3.8	1	7.9		0.75	3.8	1	15		0.75	3.8	1
Total Xylenes	1330-20-7	440	44	435,000	44	44	435,000	434,000	ug/m3	1.7	J	0.87	4.3	1	4.1	J	0.87	4.3	1	3.8	J	0.87	4.3	1

Note:
PADEP VI- Pennsylvania Department of Environmental Protection Vapor intrusion Screening Value. Indoor Air Statewide Health Standard Non-Residential Vapor Intrusion Screening Level (January 2017).
OSHA PEL TWA - Occupational Safety and Health Administration Time-Weighted Average Permissible Exposure Limit .
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HQ - Hazard Quotient
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The RSL for 1,2,4 and 1,3,5- trimethylbenzene were calculated using the September 2016 final IRIS RfC.
OSHA PELs, NIOSH RELs, and ACGIH TLVs from GHD's Air Data Evaluation Letter (Reference No. 11109626), November 9, 2016.
CAS - Chemical Abstract Registry Number
ug/m3 - Micrograms per cubic meter
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ND - Not detected
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Qualifiers:
U - Compound analyzed but not detected
J - Compound detected below below the reporting limit (the value given is an estimate).

Exceedances:
10 - Result exceeds PA VI
10 - Result exceeds 1/10th PA VI
10 - Result exceeds OSHA PEL TWA
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-5)
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-6)
10 - Result exceeds NIOSH REL
10 - Result exceeds ACGIH TLVs
15 - MDL exceeds standard

Table 8
Summary of Indoor Air Quality Analytical Results
AOI 5 Remedial Investigations Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Analyte	CAS Number	PADEP VI	1/10th PADEP VI	OSHA PEL TWA	EPA RSL Cancer Risk = 10^{-5} HQ = 0.1	EPA RSL Cancer Risk = 10^{-6} HQ = 0.1	NIOSH RELs	ACGIH TLVs	Location	GP2 Dock Building					Blending & Shipping Trailer					Field Blank				
									Sample	AOI5-AI-16-005					AOI5-AI-16-006					FIELD_BLANK				
									Date	3/28/2016					3/28/2016					3/29/2016				
									Collected By	GHD					GHD					GHD				
									Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
1,2,4-Trimethylbenzene	95-63-6	31	3.1	NS	26	26	125,000	123,000	ug/m3	1.1	J	0.98	***4.9***	1	12		0.98	***4.9***	1	ND	U		0.982	
1,2-Dibromoethane	106-93-4	0.2	0.02	153,700	0.2	0.02	346	NS	ug/m3	ND	U	***1.5***	***7.7***	1	ND	U	***1.5***	***7.7***	1	ND	U		***1.54***	
1,2-Dichloroethane	107-06-2	4.7	0.47	202,400	4.7	0.47	4,000	40,500	ug/m3	ND	U	***0.81***	***4***	1	ND	U	***0.81***	***4***	1	ND	U		***0.81***	
1,3,5-Trimethylbenzene	108-67-8	31	3.1	NS	26	26	125,000	123,000	ug/m3	ND	U	0.98	***4.9***	1	3.2	J	0.98	***4.9***	1	ND	U		0.982	
Benzene	71-43-2	16	1.6	3,190	16	1.6	319	1,600	ug/m3	1.8	J	0.64	***3.2***	1	1.8	J	0.64	***3.2***	1	ND	U		0.639	
Ethylbenzene	100-41-4	49	4.9	435,000	49	4.9	435,000	86,800	ug/m3	1.9	J	0.87	4.3	1	1.9	J	0.87	4.3	1	ND	U		0.867	
Isopropyl Benzene (Cumene)	98-82-8	1,800	180	245,000	180	180	245,000	246,000	ug/m3	ND	U	0.98	4.9	1	1.5	J	0.98	4.9	1	ND	U		0.983	
Methyl Tert-Butyl Ether	1634-04-4	470	47	NS	470	47	NS	180,000	ug/m3	ND	U	0.72	3.6	1	ND	U	0.72	3.6	1	ND	U		0.721	
Naphthalene	91-20-3	3.6	0.36	50,000	3.6	0.36	50,000	52,000	ug/m3	ND	U	***2.6***	***5.2***	1	ND	U	***2.6***	***5.2***	1	ND	U		***3.3***	
Toluene	108-88-3	22,000	2,200	754,000	2,200	2,200	375,000	75,400	ug/m3	3.1	J	0.75	3.8	1	4.6		0.75	3.8	1	ND	U		0.753	
Total Xylenes	1330-20-7	440	44	435,000	44	44	435,000	434,000	ug/m3	7.7	J	0.87	4.3	1	11		0.87	4.3	1	ND	U		1.73	

Note:
PADEP VI- Pennsylvania Department of Environmental Protection Vapor intrusion Screening Value. Indoor Air Statewide Health Standard Non-Residential Vapor Intrusion Screening Level (January 2017).
OSHA PEL TWA - Occupational Safety and Health Administration Time-Weighted Average Permissible Exposure Limit .
EPA RSL - United States Environmental Protection Agency Industrial Regional Screening Level.
HQ - Hazard Quotient
NIOSH RELs - National Institute for Occupational Safety and Health Recommended Exposure Limits.
ACGIH TLVs - American Conference of Governmental Industrial Hygienists Threshold Limit Value.
The RSL for 1,2,4 and 1,3,5- trimethylbenzene were calculated using the September 2016 final IRIS RfC.
OSHA PELs, NIOSH RELs, and ACGIH TLVs from GHD's Air Data Evaluation Letter (Reference No. 11109626), November 9, 2016.
CAS - Chemical Abstract Registry Number
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ND - Not detected
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Qualifiers:
U - Compound analyzed but not detected
J - Compound detected below below the reporting limit (the value given is an estimate).

Exceedances:
10 - Result exceeds PA VI
10 - Result exceeds 1/10th PA VI
10 - Result exceeds OSHA PEL TWA
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-5)
10 - Result exceeds EPA RSL (HQ = 0.1, Target Cancer Risk = 10-6)
10 - Result exceeds NIOSH REL
10 - Result exceeds ACGIH TLVs
15 - MDL exceeds standard

Table 9
Summary of Outdoor Worker Air Quality Analytical Results
AOI 5 Remedial Investigations Report
Philadelphia Energy Solutions Facility
Philadelphia, Pennsylvania

Analyte	CAS Number	Location	Near BH-13-29					Near A-136					Near A-183					Near WP-A					Near A-134				
		Sample	AOI5-AA-16-002-20160503					AOI5-AA-16-003-20160503					AOI5-AA-16-004-20160503					AOI5-AA-16-005-20160503					AOI5-AA-16-006-20160503				
		Date	5/6/2016					5/6/2016					5/6/2016					5/6/2016					5/6/2016				
		Collected By	Aquaterra					Aquaterra					Aquaterra					Aquaterra					Aquaterra				
		Unit	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF	Result	Q	MDL	RL	DF
1,2,4-Trimethylbenzene	95-63-6	ug/m3	2.6	J	0.21	4.2	1.68	3.5	J	0.2	4.0	1.61	2.9	J	0.2	4.0	1.61	3.0	J	0.19	3.9	1.55	2.3	J	0.2	4.0	1.61
1,2-Dibromoethane	106-93-4	ug/m3	ND	U	1.3	2.6	1.68	ND	U	1.2	2.5	1.61	ND	U	1.2	2.5	1.61	ND	U	1.2	2.4	1.55	ND	U	1.2	2.5	1.61
1,2-Dichloroethane	107-06-2	ug/m3	ND	U	0.34	0.69	1.68	ND	U	0.33	0.66	1.61	ND	U	0.33	0.66	1.61	ND	U	0.32	0.64	1.55	ND	U	0.33	0.66	1.61
1,3,5-Trimethylbenzene	108-67-8	ug/m3	1.1	J	0.31	1.7	1.68	1.3	J	0.29	1.6	1.61	1	J	0.29	1.6	1.61	1.2	J	0.28	1.5	1.55	1.1	J	0.29	1.6	1.61
Benzene	71-43-2	ug/m3	0.45	J	0.2	1.1	1.68	1.9		0.2	1.0	1.61	0.63	J	0.2	1.0	1.61	1.9		0.19	1	1.55	2.3		0.2	1.0	1.61
Ethylbenzene	100-41-4	ug/m3	1.70	J	0.71	3.7	1.68	2.1	J	0.68	3.6	1.61	1.9	J	0.68	3.6	1.61	1.7	J	0.66	3.4	1.55	1.7	J	0.68	3.6	1.61
Isopropyl Benzene (Cumene)	98-82-8	ug/m3	482		4.6	84	33.6	ND	U	0.22	4.0	1.61	7.6		0.22	4.0	1.61	ND	U	0.21	3.9	1.55	ND	U	0.22	4.0	1.61
Methyl Tert-Butyl Ether	1634-04-4	ug/m3	ND	U	0.51	6.2	1.68	ND	U	0.49	5.9	1.61	ND		0.49	5.9	1.61	ND	U	0.47	5.7	1.55	ND	U	0.49	5.9	1.61
Naphthalene	91-20-3	ug/m3	2.9	J	0.51	9	1.68	2.9	J	0.49	8.6	1.61	4	J	0.49	8.6	1.61	N2.6	J	0.47	8.3	1.55	2.5	J	0.49	8.6	1.61
Toluene	108-88-3	ug/m3	1.5		0.26	1.3	1.68	3.4		0.25	1.2	1.61	3.3		0.25	1.2	1.61	2.2		0.24	1.2	1.55	1.6		0.25	1.2	1.61
Xylenes (Total)	1330-20-7	ug/m3	2.8	J	1.3	3	1.68	1.18	J	1.3	2.8	1.61	3.3		1.3	2.8	1.61	2.9		1.2	2.7	1.55	2.7	J	1.3	2.8	1.61

Note:
ug/m3 - Micrograms per cubic meter
Q - Qualifier
MDL - Method detection limit
RL - Reporting limit
DF - Dilution factor
ND - Not detected
NS - No standard

Qualifiers:
U - Compound analyzed but not detected
J- Estimated Value. Result between method detection and reporting limits

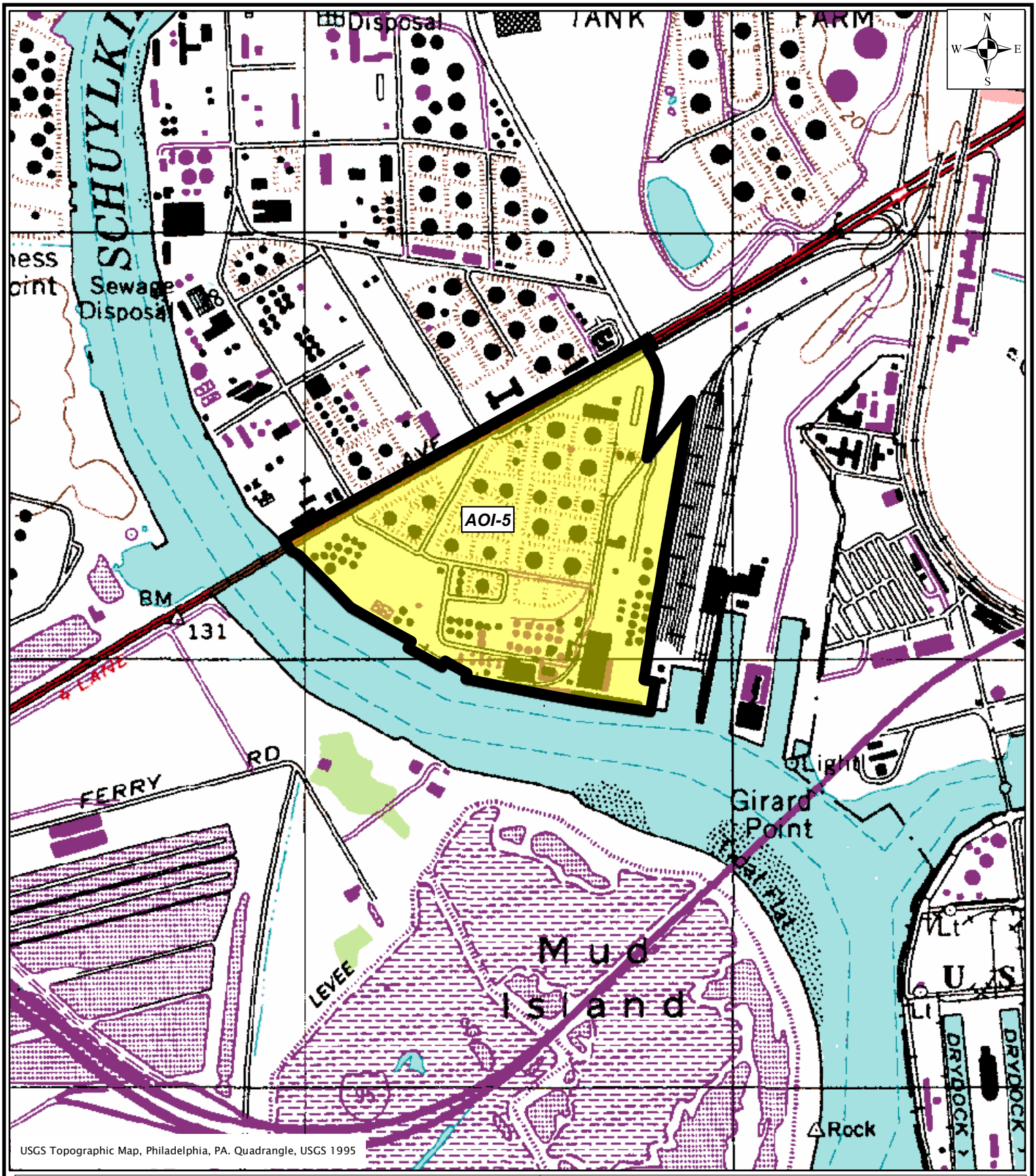
Table 10
Summary of TCLP Analytical Results
AOI 5 Site Characterization Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

Chemical Name	Analytical Method	CAS No	EPA Maximum Concentration of Contaminants for Toxicity Concentration	Location ID	BH-07-07			BH-08-07			BH-18-07			BH-23-07			BH-02-09			BH-33-09		
				Sample ID	BH-07-07_1-2			BH-08-07_.75-2			BH-18-07_1.0-2.0			BH-23-07_0-0.5			BH-02-09 TCLP NVE			BH-33-09_0.0-2.0		
				Sample Matrix	Soil			Soil			Soil			Soil			Soil			Soil		
				Sample Date	7/13/2007			7/13/2007			4/4/2007			7/11/2007			4/7/2009			7/9/2009		
				Start Depth	1			0.75			1			0			0			0		
				End Depth	2			2			2			0.5			2			2		
TCLP Metals					**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Lead (Total)	SW846 1311	7439-92-1	5	mg/l	**9.42**		0.05	0.653		0.05	**21.8**		0.05	0.78		0.05	**172**		0.3	1.04		0.015

Notes:
mg/l - milligrams per liter
RL - Reporting Limit
(1) All soil samples collected and analyzed were unsaturated
Q - Qualifier

Exceedance Summary:

10 Reported result exceeds the EPA Maximum Concentration of Contaminants for Toxicity Concentration



EVERGREEN

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

Figure 1: Site Location Map
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery

Philadelphia Pennsylvania

Job Number	Scale: 1" = 1,000'	Date
2574602	0 500 1,000 Feet	April 24, 2015

Path: \\langan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2015\Figure 1 - Site Location Map.mxd



Legend

- Penrose Avenue Sewer
- Sheet Pile Wall
- AOI Boundary

Notes:
1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).

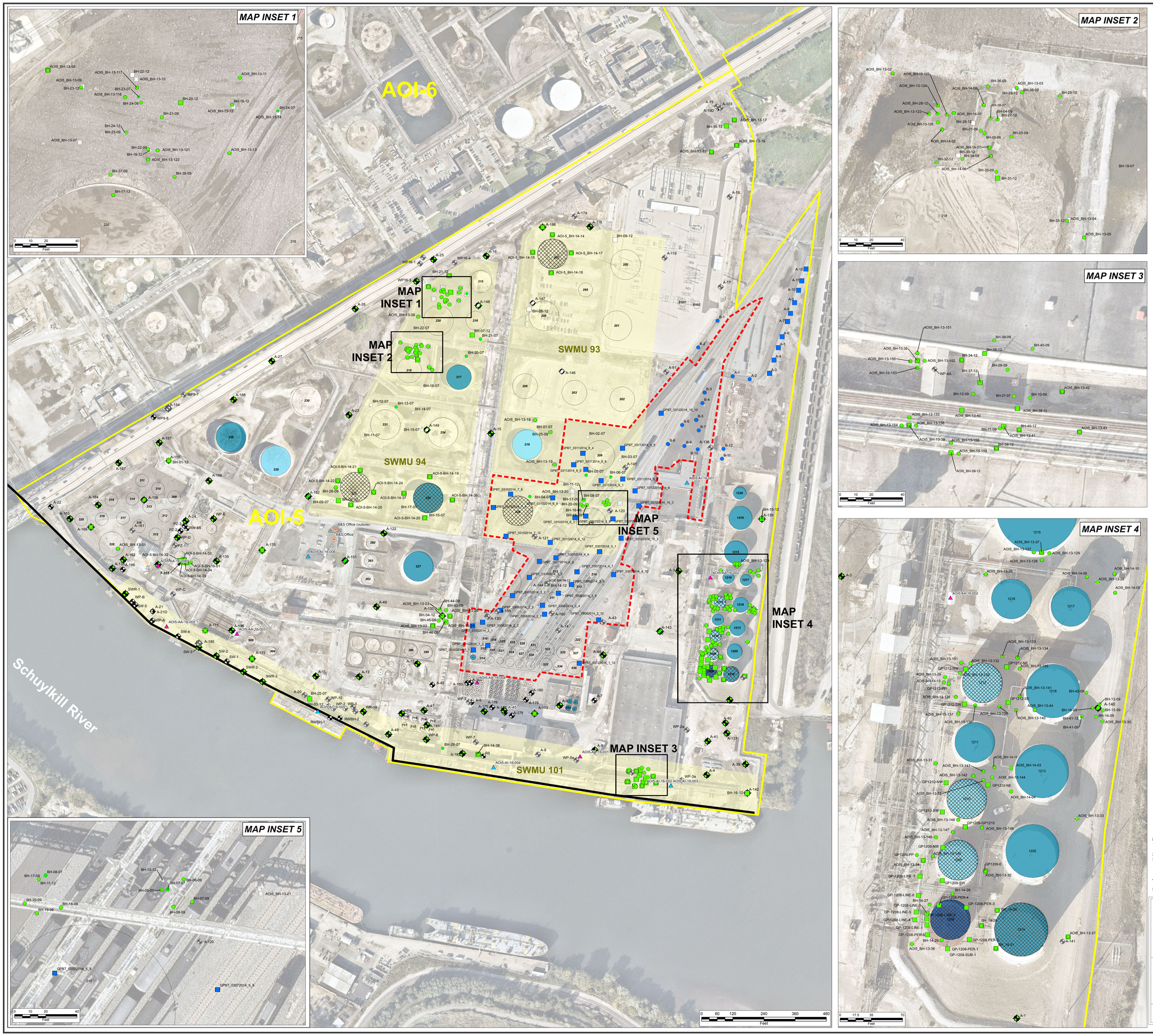
Figure 2: Site Plan
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 150 300 Feet

SCALE: 1" = 150'
DATE: May 5, 2016
DRN. BY: MH
CKD. BY: PT
JOB# 2574602

\\Langan.com\data\DYL\data\i\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2015\Final\Figure 2 - Site Plan_052716.mxd



Legend

- Surface Soil Boring Location
- Subsurface Soil Boring Location
- Proposed Surface Soil Boring Location with No Sample (Due to Groundwater)
- Proposed Subsurface Soil Boring Location with No Sample (Due to Groundwater)
- Stantec Indoor Air Sample Locations
- Aquaterra Outdoor Worker Ambient Air Sample Location
- GHD Indoor Air Sample Location
- PES Butane Rail Surface Soil Sample Location
- PES Butane Rail Subsurface Soil Sample Location
- BH-01-07 Soil Boring
- Unconfined Aquifer Monitoring Well Sampled
- Unconfined Aquifer Monitoring Well
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- Sheet Pile Wall
- Closed in Place
- Closed in Place Tank With Open Incident
- Active Tank With Open Incident
- Removed Tank With Open Incident
- Tank Currently Out of Service
- Tank In Service
- Removed Tank
- PES Butane Rail Approximate Limit of Disturbance
- Solid Waste Management Unit (SWMU)
- AOI Boundary

Notes:
1. Boundary of SWMUs and sheet pile wall referenced from RCRA Facility Investigation Chevron Refinery Vol 1, Dames and Moore, 11-24-93.
2. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
3. Historic soil sample locations referenced in the Aboveground Storage Tank Closure Assessment Report for GP 1209, 1210, and 1212 (Stantec, April 18, 2012), and the Aboveground Storage Tank GP-1208 Closure in Place Sampling Activities Report (Secor, Sept. 12, 2007).
4. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
5. Butane rail sample locations provided by Stantec.

Figure 3: Completed Activities
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 120 240 Feet

SCALE: See Map
DATE: 11/23/2016
DRN. BY: AJC
CKD. BY: KM
JOB#: 2574602

Document Path: \\langan.com\data\DY\data\2574601\AcOIS\MapDocuments\AOI-5 RIR 2016\Figure 3 - Completed Activities_112316.mxd

AOI-6

AOI-5

N

W E

S

Legend

- Monitoring Wells in A-A' Cross Section
- Monitoring Wells in B-B' Cross Section
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Monitoring Well
- Unconfined Aquifer Piezometer
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- A — A' AOI-5 Cross Section Location
- B — B' AOI-5 Cross Section Location
- Sheet Pile Wall
- AOI Boundary

Notes:

1. Aerial basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source of aerial imagery is Microsoft, 3/19/2011 (Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community)
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).

Figure 4: Geologic Cross Section Location Plan
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 150 300 Feet

SCALE: 1" = 150'
DATE: 12/6/2016
DRN. BY: AJC
CKD. BY: KM
JOB# 2574602

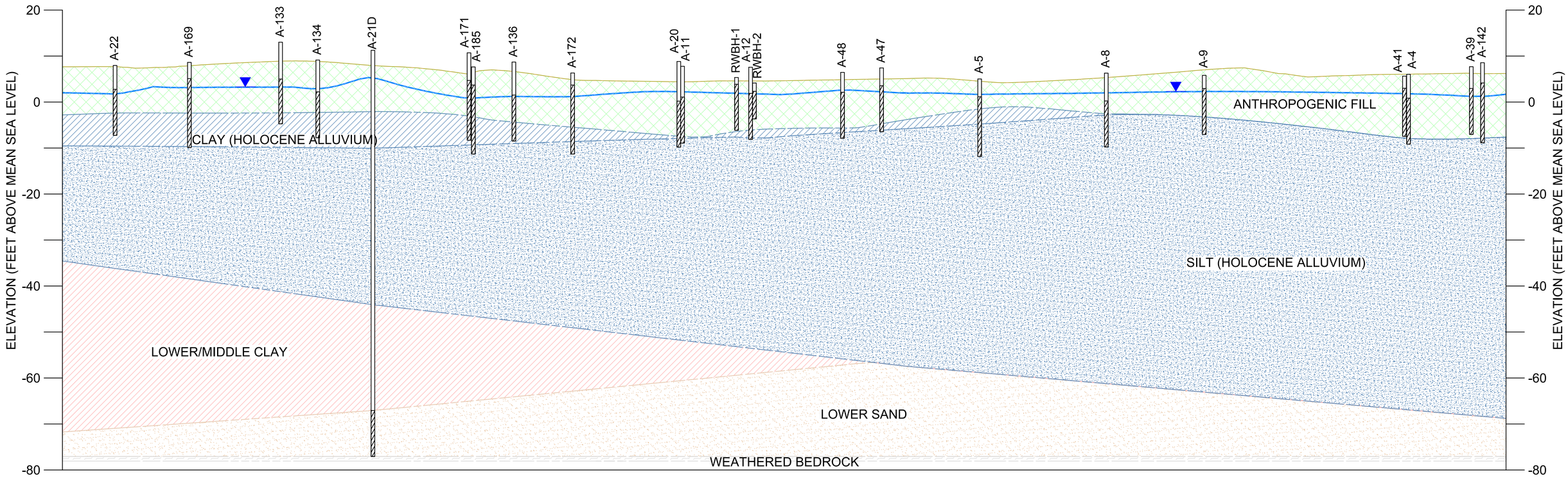
Path: \\Langan.com\data\DYL\data\62574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 4 - Cross Section Location Plan_112316.mxd

LEGEND:

- ANTHROPOGENIC FILL
- LOWER/MIDDLE CLAY
- CLAY (HOLOCENE ALLUVIUM)
- SILT (HOLOCENE ALLUVIUM)
- LOWER SAND
- WEATHERED BEDROCK
- WATER TABLE
- B-129 LOCATION ID
- WELL CASING
- WELL SCREEN

A

A'



NOTES:

1. GEOLOGIC CROSS SECTION WAS CREATED FROM THE 3D GEOLOGIC MODEL OF AOI 5, WHICH WAS GENERATED IN EARTH VOLUMETRIC STUDIO (EVS) SOFTWARE.
2. THE WATER TABLE SURFACE WAS INTERPOLATED IN EVS USING THE GROUNDWATER ELEVATION DATA COLLECTED DURING THE OCTOBER 2014 GAUGING EVENT BY AQUATERRA TECHNOLOGIES, INC.

5 0 1 2 5
VERTICAL SCALE IN FEET

100 0 50 100
HORIZONTAL SCALE IN FEET

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

Project
AOI-5 REMEDIAL INVESTIGATION REPORT
PES PHILADELPHIA REFINERY
PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title
GEOLOGIC CROSS SECTION A-A'

Project No. 2574602	Drawing No. 5A
Date 1 DECEMBER 2016	
Scale 1"=100' HOR. 1"=5' VER.	
Drn. By MMK	
Last Revised 2 DECEMBER 2016	

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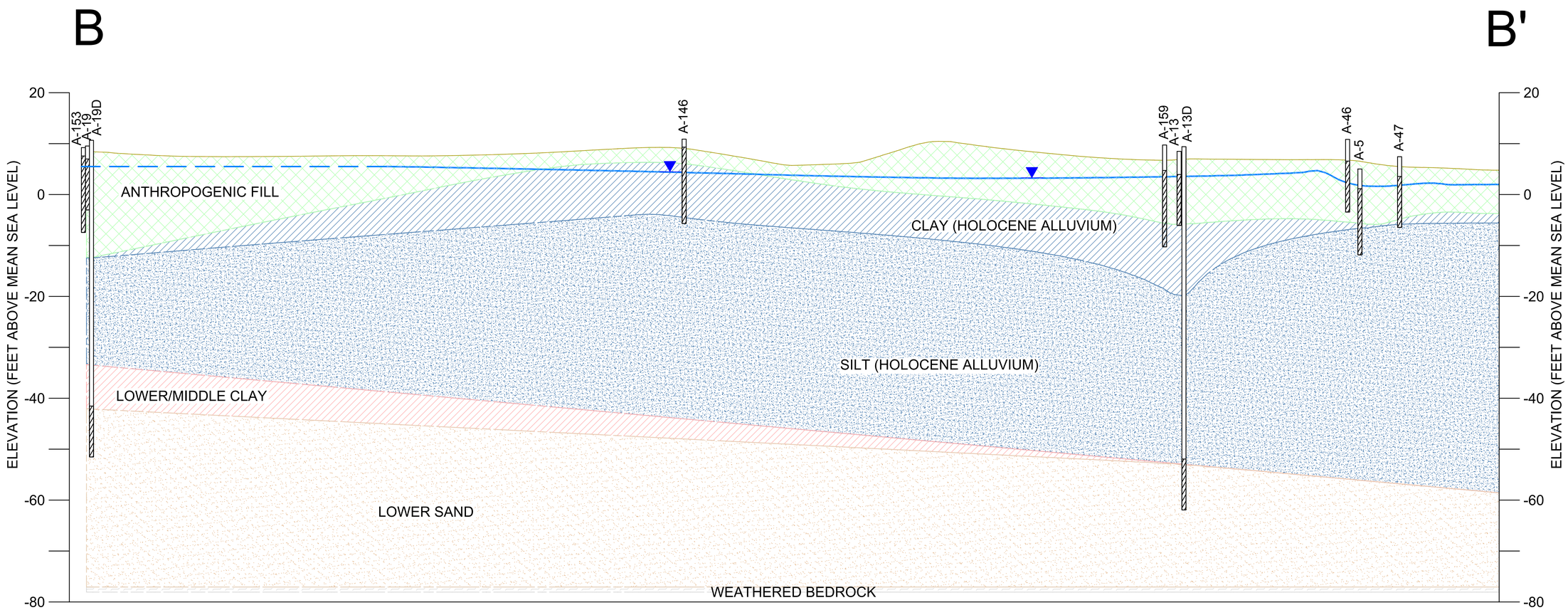
LEGEND:

- ANTHROPOGENIC FILL
- LOWER/MIDDLE CLAY
- CLAY (HOLOCENE ALLUVIUM)
- WATER TABLE
- B-129 LOCATION ID
- WELL CASING
- WELL SCREEN
- SILT (HOLOCENE ALLUVIUM)
- LOWER SAND
- WEATHERED BEDROCK
- INFERRED WATER TABLE



NOTES:

1. GEOLOGIC CROSS SECTION WAS CREATED FROM THE 3D GEOLOGIC MODEL OF AOI 5, WHICH WAS GENERATED IN EARTH VOLUMETRIC STUDIO (EVS) SOFTWARE.
2. THE WATER TABLE SURFACE WAS INTERPOLATED IN EVS USING THE GROUNDWATER ELEVATION DATA COLLECTED DURING THE OCTOBER 2014 GAUGING EVENT BY AQUATERRA TECHNOLOGIES, INC.
3. MONITORING WELL A-19 HAS BEEN DESTROYED, AND MONITORING WELL A-153 WAS UNABLE TO BE LOCATED DURING THE OCTOBER 2014 GAUGING EVENT. THEREFORE, THE WATER TABLE SURFACE IS INFERRED AT THESE WELLS.

5 0 1 2 5
VERTICAL SCALE IN FEET

100 0 50 100
HORIZONTAL SCALE IN FEET

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

Project
AOI-5 REMEDIAL INVESTIGATION REPORT
PES PHILADELPHIA REFINERY
PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title
GEOLOGIC CROSS SECTION B-B'

Project No. 2574602	Drawing No. 5B
Date 1 DECEMBER 2016	
Scale 1"=100' HOR. 1"=5' VER.	
Drn. By MMK	
Last Revised 2 DECEMBER 2016	

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Legend

- A-151 — Unconfined Aquifer Monitoring Well and Groundwater Elevation (ft.)
- SWR-1 — Unconfined Aquifer Recovery Well and Groundwater Elevation (ft.)
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Monitoring Well
- Unconfined Aquifer Piezometer
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- Groundwater Contour (ft - amsl)
- Inferred Groundwater Contour (ft - amsl)
- Sheet Pile Wall
- AOI Boundary
- ft - amsl — Feet above mean sea level

Notes:
1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
3. Groundwater gauging completed in July 2014 by Aquaterra.

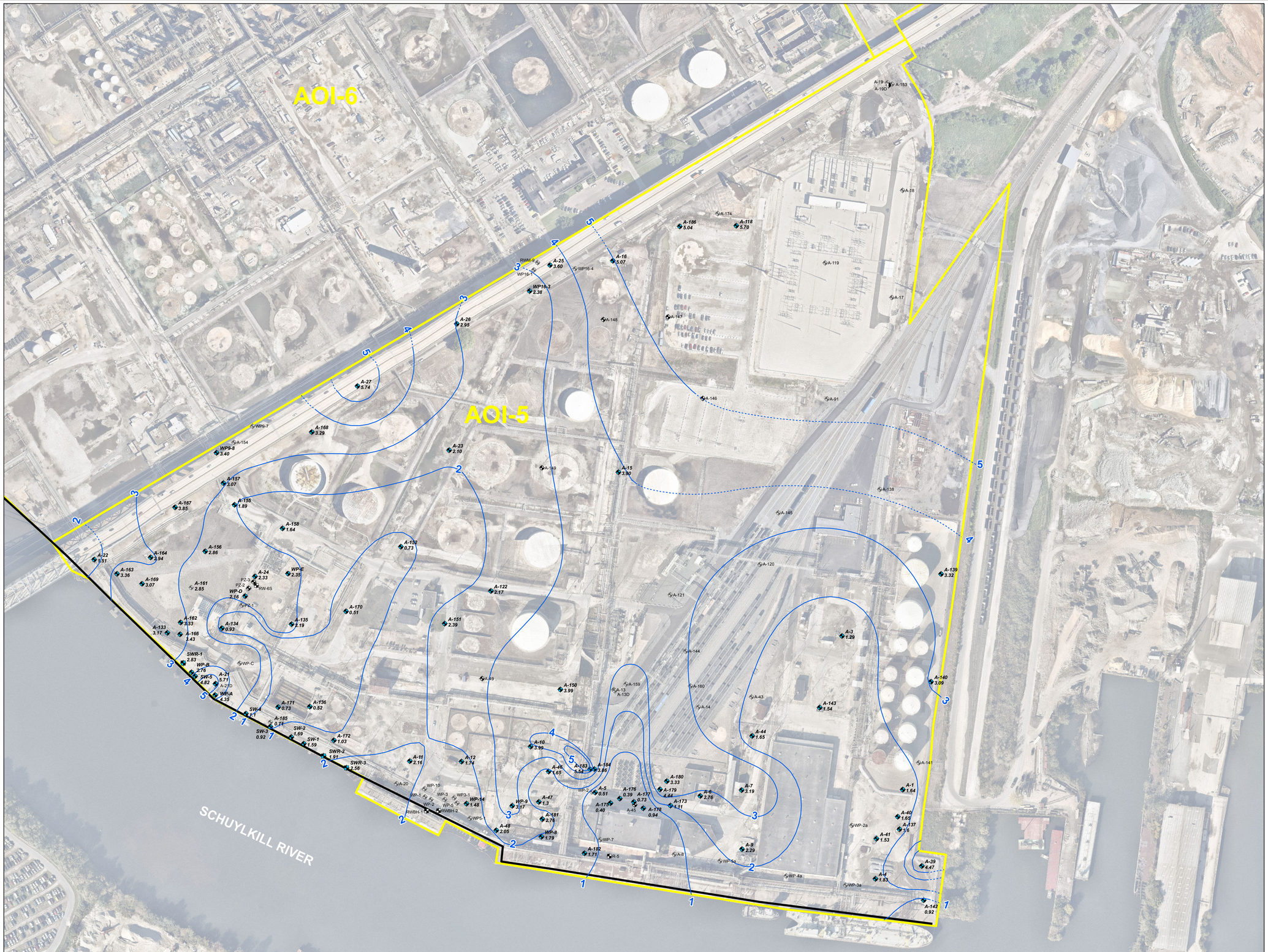
Figure 6: Unconfined Aquifer Groundwater Elevation Contour Plan (July 2014)
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 150 300 Feet

SCALE: 1" = 150'
DATE: 11/23/2016
DRN. BY: AJC
CKD. BY: KM
JOB#: 2574602

Path: \\aqua\gan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 6 - Shallow GW Elevation Contour Plan (July 2014)_112316.mxd



Legend

- A-151 2.39 — Unconfined Aquifer Monitoring Well and Groundwater Elevation (ft.)
- SWR-1 2.83 — Unconfined Aquifer Recovery Well and Groundwater Elevation (ft.)
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Monitoring Well
- Unconfined Aquifer Piezometer
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- 1 — Groundwater Contour (ft - amsl)
- Inferred Groundwater Contour (ft - amsl)
- Sheet Pile Wall
- AOI Boundary
- ft - amsl — Feet above mean sea level

Notes:
1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
3. Groundwater gauging completed in October 2014 by Aquaterra.

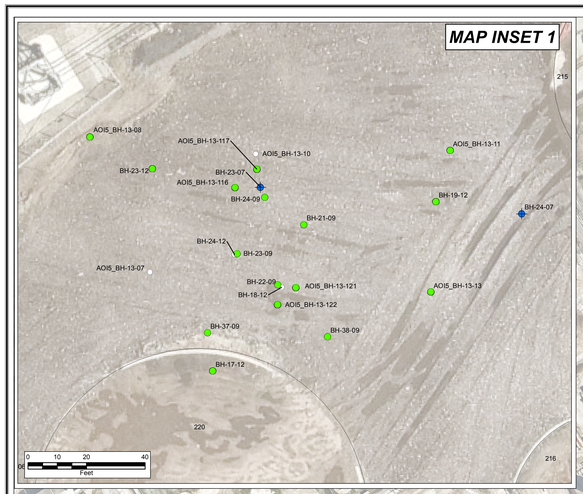
Figure 7: Unconfined Aquifer Groundwater Elevation Contour Plan (October 2014)
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

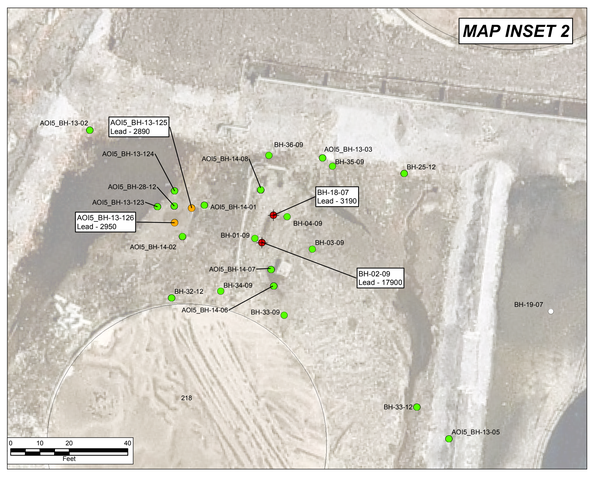
0 150 300 Feet

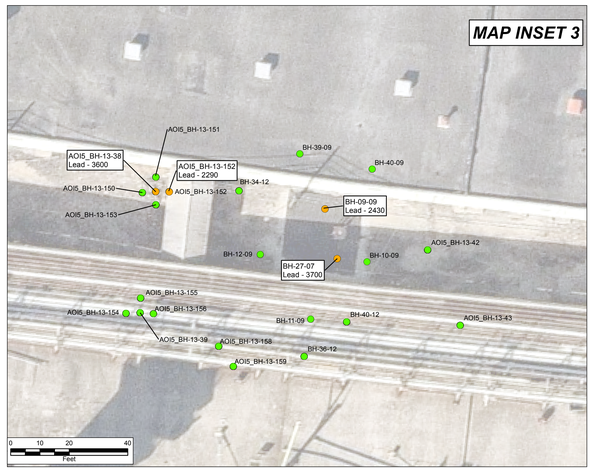
SCALE: 1" = 150
DATE: 11/23/2016
DRN. BY: AJC
CKD. BY: KM
JOB#: 2574602

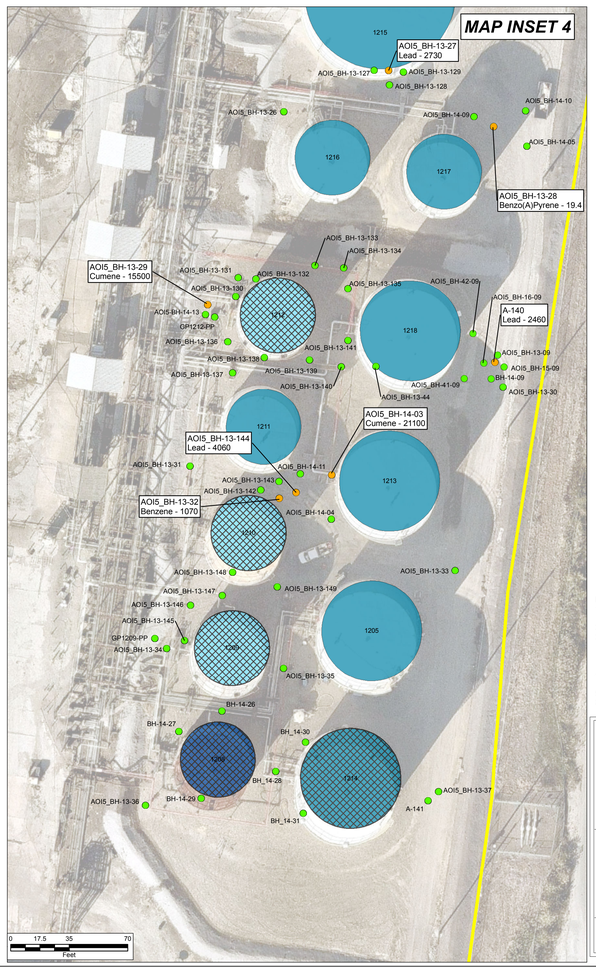
Path: \\langan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 7 - Shallow GW Elevation Contour Plan (October 2014)_112316.mxd











N
W E
S

Legend

- Surface Soil Boring Location with No Exceedance of Direct Contact MSCs or SSS For Lead
- Surface Soil Boring Location with Exceedance of Direct Contact MSCs or SSS For Lead
- Proposed Surface Soil Boring Location with No Sample (Due to Groundwater)
- Soil Boring Location With Observed Leaded Tank Bottom Material
- Soil Boring Location With Documented Leaded Tank Bottom Material
- PES Butane Rail Surface Soil Sample Location

BH-01-07 Soil Boring

Sheet Pile Wall

Closed in Place

Closed in Place Tank With Open Incident

Active Tank With Open Incident

Removed Tank With Open Incident

Tank Currently Out of Service

Tank In Service

Removed Tank

Solid Waste Management Unit (SWMU)

AOI Boundary

Site-Specific Standard (SSS)

Lead - 2,240 mg/kg

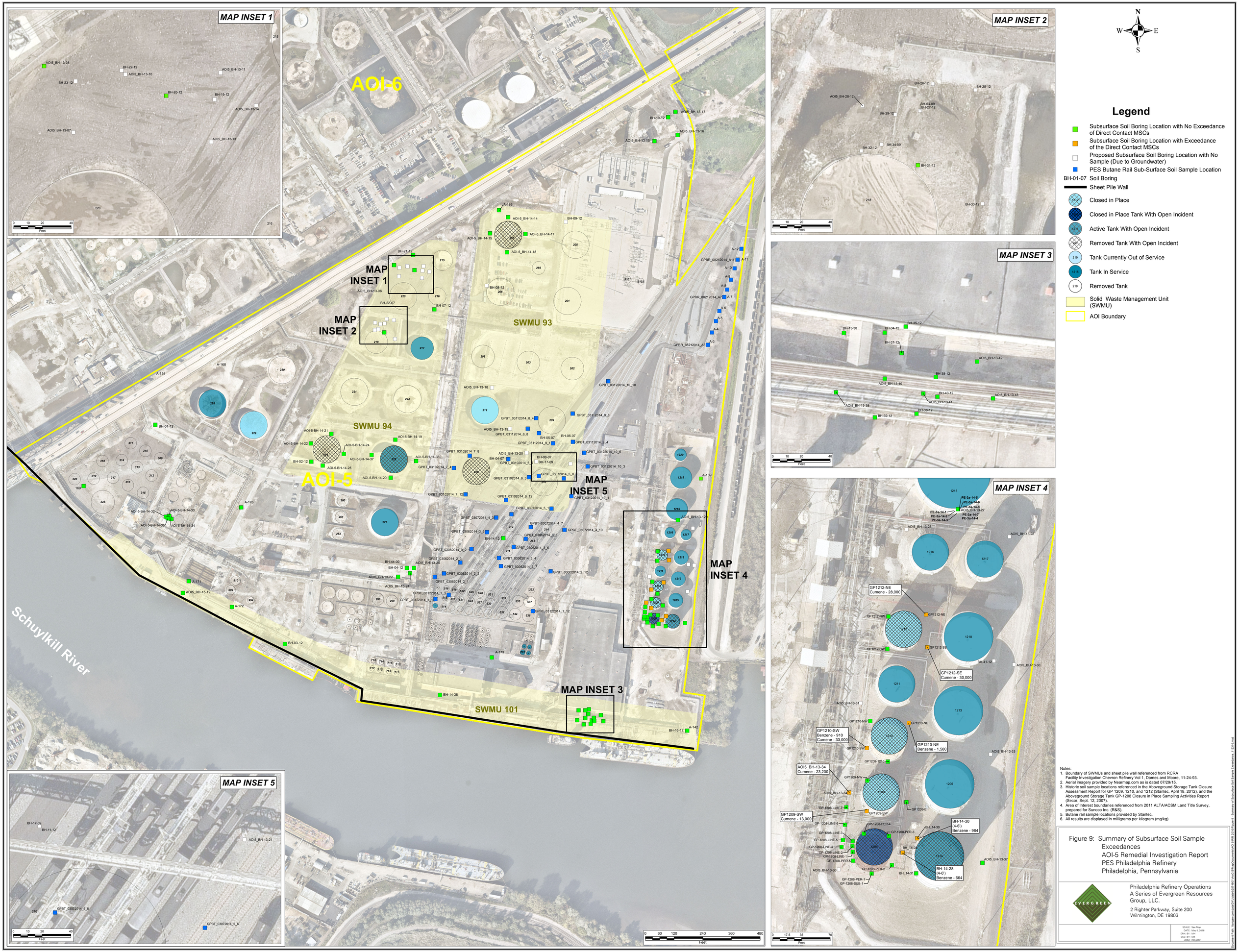
Notes:
1. Boundary of SWMUs and sheet pile wall referenced from RCRA Facility Investigation Chevron Refinery Vol 1, Dames and Moore, 11-24-93.
2. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
3. Historic soil sample locations referenced in the Aboveground Storage Tank Closure Assessment Report for GP 1209, 1210, and 1212 (Stantec, April 18, 2012), and the Aboveground Storage Tank GP-1208 Closure in Place Sampling Activities Report (Secor, Sept. 12, 2007).
4. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
5. Butane rail sample locations provided by Stantec.
6. All results are displayed in milligrams per kilogram (mg/kg)

Figure 8: Summary of Surface Soil Sample Exceedances
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

SCALE: See Map
DATE: May 5, 2016
DRN. BY: MH
CKD. BY: KM
JOB#: 2574602

Document Path: L:\arcgis\projects\2574602\ArcGISMapDocuments\AOI-5 RIR 2016\Figure 8 - Summary of Surface Soil Sample Exceedance_112315.mxd



Legend

- Subsurface Soil Boring Location with No Exceedance of Direct Contact MSCs
- Subsurface Soil Boring Location with Exceedance of the Direct Contact MSCs
- Proposed Subsurface Soil Boring Location with No Sample (Due to Groundwater)
- PES Butane Rail Sub-Surface Soil Sample Location
- BH-01-07 Soil Boring
- Sheet Pile Wall
- 1212 Closed in Place
- Closed in Place Tank With Open Incident
- 1214 Active Tank With Open Incident
- 207 Removed Tank With Open Incident
- 219 Tank Currently Out of Service
- 1215 Tank In Service
- 218 Removed Tank
- Solid Waste Management Unit (SWMU)
- AOI Boundary

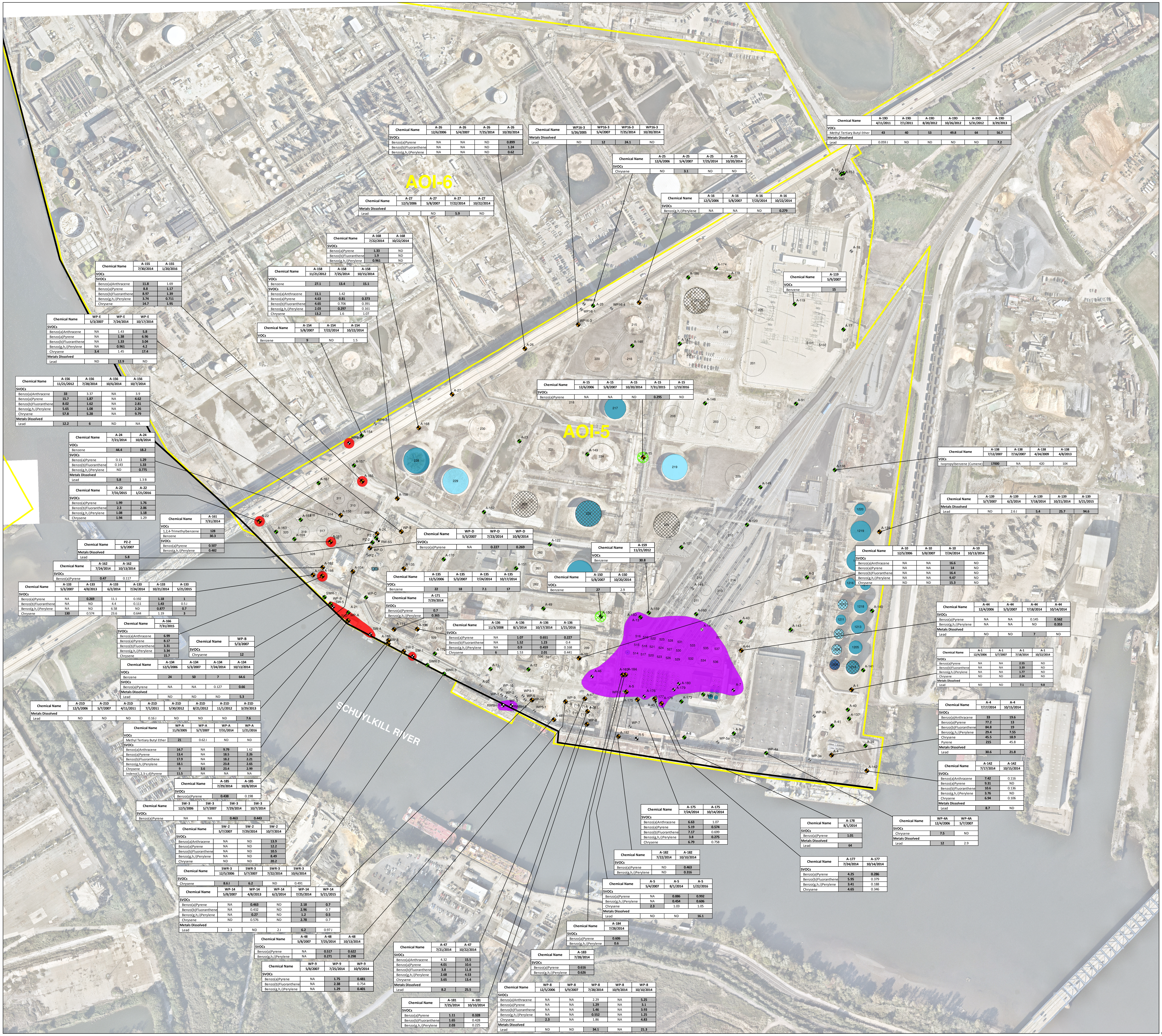
Notes:
1. Boundary of SWMUs and sheet pile wall referenced from RCRA Facility Investigation Chevron Refinery Vol 1, Dames and Moore, 11-24-93.
2. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
3. Historic soil sample locations referenced in the Aboveground Storage Tank Closure Assessment Report for GP 1209, 1210, and 1212 (Stantec, April 18, 2012), and the Aboveground Storage Tank GP-1208 Closure in Place Sampling Activities Report (Secor, Sept. 12, 2007).
4. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
5. Butane rail sample locations provided by Stantec.
6. All results are displayed in milligrams per kilogram (mg/kg)

Figure 9: Summary of Subsurface Soil Sample Exceedances
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

SCALE: See Map
DATE: May 5, 2016
DRN: BY: MH
CKD: BY: KM
JOB#: 2574602

Document Path: I:\engin.com\data\NYL\data\257460\Arcd\GIS\MapDocuments\AOI 5 Rifi 2165\Figure 9 - Summary of Subsurface Soil Sample Exceedance_112316.mxd



Chemical Name	A-26 12/6/2006	A-26 5/4/2007	A-26 7/25/2014	A-26 10/20/2014
SVOCs				
Benzo(a)Pyrene	NA	NA	ND	0.899
Benzo(b)Fluoranthene	NA	NA	ND	1.24
Benzo(g,h,i)Perylene	NA	NA	ND	0.62

Chemical Name	WP16-3 5/26/2005	WP16-3 5/4/2007	WP16-3 7/25/2014	WP16-3 10/20/2014
Metals Dissolved				
Lead	ND	12	24.1	ND

Chemical Name	A-19D 4/11/2011	A-19D 7/1/2011	A-19D 8/20/2012	A-19D 10/26/2012	A-19D 5/31/2012	A-19D 3/29/2013
VOCs						
Methyl Tertiary Butyl Ether	43	40	53	49.8	64	56.7
Metals Dissolved						
Lead	0.059 J	ND	ND	ND	ND	7.2

Chemical Name	A-25 12/6/2006	A-25 5/4/2007	A-25 7/25/2014	A-25 10/20/2014
SVOCs				
Chrysene	ND	3.1	ND	ND

Chemical Name	A-27 12/5/2006	A-27 5/8/2007	A-27 7/22/2014	A-27 10/22/2014
Metals Dissolved				
Lead	2	ND	5.9	ND

Chemical Name	A-16 12/5/2006	A-16 5/8/2007	A-16 7/23/2014	A-16 10/22/2014
SVOCs				
Benzo(g,h,i)Perylene	NA	NA	ND	0.279

Chemical Name	A-168 7/22/2014	A-168 10/22/2014
SVOCs		
Benzo(a)Pyrene	1.33	ND
Benzo(b)Fluoranthene	1.9	ND
Benzo(g,h,i)Perylene	0.961	ND

Chemical Name	A-155 7/30/2014	A-155 1/20/2016
VOCs		
SVOCs		
Benzo(a)Anthracene	11.8	1.69
Benzo(a)Pyrene	8.8	1.17
Benzo(b)Fluoranthene	8.97	1.39
Benzo(g,h,i)Perylene	3.74	0.711
Chrysene	14.7	1.95

Chemical Name	A-158 11/21/2012	A-158 7/25/2014	A-158 10/15/2014
VOCs			
Benzene	27.1	13.4	15.1
SVOCs			
Benzo(a)Anthracene	11.1	1.42	1
Benzo(a)Pyrene	4.63	0.81	0.373
Benzo(b)Fluoranthene	4.65	0.706	0.391
Benzo(g,h,i)Perylene	2.03	0.297	0.161
Chrysene	13.2	1.6	1.07

Chemical Name	A-119 5/9/2007
VOCs	
Benzene	15

Chemical Name	WP-E 5/3/2007	WP-E 7/24/2014	WP-E 10/17/2014
SVOCs			
Benzo(a)Anthracene	NA	1.43	5.8
Benzo(a)Pyrene	NA	1.38	6.96
Benzo(b)Fluoranthene	NA	1.33	3.04
Benzo(g,h,i)Perylene	NA	0.961	4.2
Chrysene	3.4	1.45	17.4
Metals Dissolved			
Lead	ND	12.9	ND

Chemical Name	A-154 5/8/2007	A-154 7/22/2014	A-154 10/22/2014
VOCs			
Benzene	9	ND	1.5

Chemical Name	A-156 11/21/2012	A-156 7/28/2014	A-156 10/6/2014	A-156 10/7/2014
SVOCs				
Benzo(a)Anthracene	33	3.37	NA	3.9
Benzo(a)Pyrene	15.7	1.87	NA	4.62
Benzo(b)Fluoranthene	8.02	1.62	NA	2.81
Benzo(g,h,i)Perylene	5.65	1.08	NA	2.26
Chrysene	57.8	5.28	NA	9.79
Metals Dissolved				
Lead	12.2	6	ND	NA

Chemical Name	A-15 12/6/2006	A-15 5/8/2007	A-15 10/20/2014	A-15 7/31/2015	A-15 1/19/2016
SVOCs					
Benzo(a)Pyrene	NA	NA	ND	0.295	ND

Chemical Name	A-138 7/12/2007	A-138 7/16/2007	A-138 4/24/2009	A-138 4/8/2013
VOCs				
Isopropylbenzene (Cumene)	17000	NA	420	104

Chemical Name	A-24 7/21/2014	A-24 10/8/2014
VOCs		
Benzene	44.4	18.2
SVOCs		
Benzo(a)Pyrene	0.13	1.29
Benzo(b)Fluoranthene	0.143	1.33
Benzo(g,h,i)Perylene	ND	0.775
Metals Dissolved		
Lead	5.8	1.3 B

Chemical Name	A-22 7/31/2015	A-22 1/21/2016
SVOCs		
Benzo(a)Pyrene	1.99	1.76
Benzo(b)Fluoranthene	2.3	2.06
Benzo(g,h,i)Perylene	1.08	1.18
Chrysene	1.94	1.29

Chemical Name	A-139 5/7/2007	A-139 6/2/2014	A-139 7/18/2014	A-139 10/21/2014	A-139 5/21/2015
Metals Dissolved					
Lead	ND	2.6 J	5.4	25.7	94.6

Chemical Name	A-161 7/31/2014
VOCs	
1,2,4-Trimethylbenzene	128
Benzene	30.3
SVOCs	
Benzo(a)Pyrene	0.507
Benzo(g,h,i)Perylene	0.482

Chemical Name	WP-D 5/3/2007	WP-D 7/23/2014	WP-D 10/8/2014
SVOCs			
Benzo(a)Pyrene	NA	0.227	0.269

Chemical Name	A-159 11/21/2012
VOCs	
Benzene	30.8

Chemical Name	PZ-2 5/3/2007
Metals Dissolved	
Lead	5.8

Chemical Name	A-162 7/24/2014	A-162 10/13/2014
SVOCs		
Benzo(a)Pyrene	0.47	0.117

Chemical Name	A-10 12/5/2006	A-10 5/8/2007	A-10 7/24/2014	A-10 10/13/2014
SVOCs				
Benzo(a)Anthracene	NA	NA	16.6	ND
Benzo(a)Pyrene	NA	NA	14	ND
Benzo(b)Fluoranthene	NA	NA	16.4	ND
Benzo(g,h,i)Perylene	NA	NA	9.47	ND
Chrysene	ND	ND	15.3	ND

Chemical Name	A-135 12/5/2006	A-135 5/3/2007	A-135 7/24/2014	A-135 10/17/2014
VOCs				
Benzene	22	18	7.1	17

Chemical Name	A-150 5/8/2007	A-150 10/20/2014
VOCs		
Benzene	27	2.9

Chemical Name	A-133 5/3/2007	A-133 4/8/2013	A-133 6/2/2014	A-133 7/24/2014	A-133 10/21/2014	A-133 5/21/2015
SVOCs						
Benzo(a)Pyrene	NA	0.269	11.1	0.192	1.18	1
Benzo(b)Fluoranthene	NA	ND	4.4	0.111	1.43	0.5 J
Benzo(g,h,i)Perylene	NA	ND	6.58	ND	0.877	0.7
Chrysene	130	0.574	23.6	0.644	1.19	3

Chemical Name	A-171 7/29/2014
SVOCs	
Benzo(a)Pyrene	0.7
Benzo(g,h,i)Perylene	0.365

Chemical Name	A-44 12/4/2006	A-44 5/3/2007	A-44 7/18/2014	A-44 10/14/2014
SVOCs				
Benzo(a)Pyrene	NA	NA	0.145	0.562
Benzo(g,h,i)Perylene	NA	NA	ND	0.353
Metals Dissolved				
Lead	ND	ND	7	ND

Chemical Name	A-166 7/31/2015
SVOCs	
Benzo(a)Anthracene	6.99
Benzo(a)Pyrene	8.17
Benzo(b)Fluoranthene	3.31
Benzo(g,h,i)Perylene	3.34
Chrysene	15.7

Chemical Name	WP-B 5/3/2007
SVOCs	
Chrysene	12

Chemical Name	A-136 11/3/2008	A-136 8/1/2014	A-136 10/17/2014	A-136 1/21/2016
SVOCs				
Benzo(a)Pyrene	NA	1.07	0.651	0.227
Benzo(b)Fluoranthene	NA	1.52	1.23	0.4
Benzo(g,h,i)Perylene	NA	0.9	0.459	0.168
Chrysene	6	1.53	2.01	0.441

Chemical Name	A-1 12/4/2006	A-1 5/7/2007	A-1 7/18/2014	A-1 10/22/2014
SVOCs				
Benzo(a)Pyrene	NA	NA	2.55	ND
Benzo(b)Fluoranthene	NA	NA	3.39	ND
Benzo(g,h,i)Perylene	NA	NA	1.77	ND
Chrysene	ND	ND	2.34	ND
Metals Dissolved				
Lead	ND	ND	7.1	9.8

Chemical Name	A-134 12/5/2006	A-134 5/3/2007	A-134 7/24/2014	A-134 10/13/2014
VOCs				
Benzene	24	50	7	64.6
SVOCs				
Benzo(a)Pyrene	NA	NA	0.127	0.66
Metals Dissolved				
Lead	ND	ND	ND	5.3

Chemical Name	A-21D 12/5/2006	A-21D 5/7/2007	A-21D 4/11/2011	A-21D 7/1/2011	A-21D 5/30/2012	A-21D 8/21/2012	A-21D 11/1/2012	A-21D 3/29/2013
Metals Dissolved								
Lead	ND	ND	ND	0.16 J	ND	ND	ND	7.6

Chemical Name	A-4 7/17/2014	A-4 10/15/2014
SVOCs		
Benzo(a)Anthracene	33	19.6
Benzo(a)Pyrene	77.2	13
Benzo(b)Fluoranthene	84.8	19
Benzo(g,h,i)Perylene	29.4	7.55
Chrysene	45.5	18.9
Pyrene	215	45.8
Metals Dissolved		
Lead	30.6	21.8

Chemical Name	WP-A 11/9/2005	WP-A 5/7/2007	WP-A 7/31/2014	WP-A 1/21/2016
VOCs				
Methyl Tertiary Butyl Ether	21	0.62 J	ND	ND
SVOCs				
Benzo(a)Anthracene	14.7	NA	9.79	1.62
Benzo(a)Pyrene	13.4	NA	18.5	2.26
Benzo(b)Fluoranthene	17.9	NA	18.2	2.21
Benzo(g,h,i)Perylene	18.1	NA	23.8	2.65
Chrysene	9	3.6	23.4	2.99
Indeno(1,2,3-c,d)Pyrene	11.5	NA	NA	NA

Chemical Name	A-142 7/17/2014	A-142 10/15/2014
SVOCs		
Benzo(a)Anthracene	7.42	0.116
Benzo(a)Pyrene	9.31	ND
Benzo(b)Fluoranthene	10.6	0.136
Benzo(g,h,i)Perylene	3.76	ND
Chrysene	6.94	0.106
Metals Dissolved		
Lead	8.7	ND

Chemical Name	A-185 7/29/2014	A-185 10/8/2014
SVOCs		
Benzo(a)Pyrene	0.438	0.198

Chemical Name	SW-3 12/5/2006	SW-3 5/7/2007	SW-3 7/29/2014	SW-3 10/7/2014
SVOCs				
Benzo(a)Pyrene	NA	NA	0.463	0.443

Chemical Name	A-175 7/24/2014	A-175 10/14/2014
SVOCs		
Benzo(a)Anthracene	6.63	1.07
Benzo(a)Pyrene	5.19	0.574
Benzo(b)Fluoranthene	7.17	0.699
Benzo(g,h,i)Perylene	3.8	0.275
Chrysene	6.79	0.758

Chemical Name	A-178 8/1/2014
SVOCs	
Benzo(a)Pyrene	1.01
Metals Dissolved	
Lead	64

Chemical Name	WP-4A 12/4/2006	WP-4A 5/7/2007
SVOCs		
Chrysene	7.5	ND
Metals Dissolved		
Lead	12	2.9

Chemical Name	SW-2 5/7/2007	SW-2 7/29/2014	SW-2 10/7/2014
SVOCs			
Benzo(a)Anthracene	NA	ND	13.9
Benzo(a)Pyrene	NA	ND	12.2
Benzo(b)Fluoranthene	NA	ND	10.5
Benzo(g,h,i)Perylene	NA	ND	8.49
Chrysene	ND	ND	20.2

Chemical Name	A-182 7/22/2014	A-182 10/10/2014
SVOCs		
Benzo(a)Pyrene	ND	0.463
Benzo(g,h,i)Perylene	ND	0.316

Chemical Name	A-177 7/24/2014	A-177 10/14/2014
SVOCs		
Benzo(a)Pyrene	4.25	0.286
Benzo(b)Fluoranthene	5.95	0.379
Benzo(g,h,i)Perylene	3.41	0.188
Chrysene	4.65	0.346

Chemical Name	SWR-3 12/5/2006	SWR-3 5/7/2007	SWR-3 7/22/2014	SWR-3 10/6/2014
SVOCs				
Chrysene	8.6 J	6.2	ND	0.491

Chemical Name	WP-14 5/8/2007	WP-14 4/8/2013	WP-14 6/2/2014	WP-14 7/25/2014	WP-14 5/21/2015
SVOCs					
Benzo(a)Pyrene	NA	0.463	ND	2.18	0.7
Benzo(b)Fluoranthene	NA	0.432	ND	2.96	0.7
Benzo(g,h,i)Perylene	NA	0.27	ND	1.2	0.5
Chrysene	ND	0.576	ND	2.78	0.7
Metals Dissolved					
Lead	2.3	ND	2 J	6.2	0.97 J

Chemical Name	A-5 5/4/2007	A-5 8/1/2014	A-5 1/22/2016
SVOCs			
Benzo(a)Pyrene	NA	0.886	0.992
Benzo(g,h,i)Perylene	NA	0.454	0.606
Chrysene	2.3	1.03	1.05
Metals Dissolved			
Lead	ND	ND	16.1

Chemical Name	A-184 7/28/2014
SVOCs	
Benzo(a)Pyrene	0.606
Benzo(g,h,i)Perylene	0.6

Chemical Name	A-48 5/8/2007	A-48 7/25/2014	A-48 10/13/2014
SVOCs			
Benzo(a)Pyrene	NA	0.517	0.622
Benzo(g,h,i)Perylene	NA	0.271	0.298

Chemical Name	A-47 7/21/2014	A-47 10/22/2014
SVOCs		
Benzo(a)Anthracene	4.32	15.5
Benzo(a)Pyrene	4.01	10.6
Benzo(b)Fluoranthene	3.8	11.8
Benzo(g,h,i)Perylene	2.68	4.53
Chrysene	3.65	13.4
Metals Dissolved		
Lead	8.2	25.5

Chemical Name	A-183 7/28/2014
SVOCs	
Benzo(a)Pyrene	0.616
Benzo(g,h,i)Perylene	0.626

Chemical Name	WP-9 5/8/2007	WP-9 7/25/2014	WP-9 10/9/2014
SVOCs			
Benzo(a)Pyrene	NA	1.75	0.481
Benzo(b)Fluoranthene	NA	2.38	0.754
Benzo(g,h,i)Perylene	NA	1.29	0.401

Chemical Name	WP-8 12/5/2006	WP-8 5/9/2007	WP-8 7/28/2014	WP-8 10/9/2014	WP-8 10/10/2014
SVOCs					
Benzo(a)Anthracene	NA	NA	2.29	NA	5.25
Benzo(a)Pyrene	NA	NA	1.29	NA	3.1
Benzo(b)Fluoranthene	NA	NA	1.46	NA	3.93
Benzo(g,h,i)Perylene	NA	NA	0.552	NA	1.25
Chrysene	2.3	NA	1.86	NA	4.83
Metals Dissolved					
Lead	ND	ND	34.1	NA	21.3

Chemical Name	A-181 7/25/2014	A-181 10/10/2014
SVOCs		
Benzo(a)Pyrene	1.11	0.328
Benzo(b)Fluoranthene	1.65	0.428
Benzo(g,h,i)Perylene	2.03	0.225

N W E S

Legend

- Groundwater Sample with an Exceedance between 2014 - 2016
- Groundwater Sample with No Exceedance between 2014 - 2016
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Monitoring Well
- Unconfined Aquifer Piezometer
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- Sheet Pile Wall
- 1212 Closed in Place
- 1208 Closed in Place Tank With Open Incident
- 1214 Active Tank With Open Incident
- 207 Removed Tank With Open Incident
- 219 Tank Currently Out of Service
- 1215 Tank In Service
- 218 Removed Tank
- AOIs
- 10 Result Exceeds PADEP Non-Residential Used Aquifer MSC TDS<2500 mg/L

LNAPL Types

- Middle Distillate
- Heavy Distillate
- Unknown

Groundwater Screening Criteria

Chemical Name	CAS No.	PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Groundwater MSCs (ug/L)
Volatile Organic Compounds		
1,2,4-Trimethylbenzene	95-63-6	
Benzene	71-43-2	5
Isopropylbenzene (cumene)	98-82-8	3500
Methyl Tertiary Butyl Ether	1634-04-4	20
Semi-Volatile Organic Compounds		
Benzo(a)anthracene	56-55-3	4.9
Benzo(a)pyrene	50-32-8	0.2
Benzo(b)fluoranthene	205-99-2	1.2
Benzo(g,h,i)perylene	191-24-2	0.26
Chrysene	218-01-9	1.9
Indeno(1,2,3-c,d)pyrene	193-39-5	3.6
Pyrene	129-00-0	130
Metals Dissolved		
Lead	7439-92-1	5

Notes:
1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
3. Groundwater exceedances or criteria displayed in micrograms per liter (ug/L)

Figure 10: Summary of Groundwater Sample Exceedances
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 140 280 Feet

SCALE: 1" = 140'
DATE: 11/23/2016
DRN. BY: AJC
CKD. BY: ED
JOB#: 2574602

Path: \\langan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 10 - GW Exceedances 2014 to 2016_112316.mxd



N
W E
S

Legend

- Stantec Indoor Air Sample Locations
- Aquaterra Outdoor Worker Ambient Air Sample Location
- GHD Indoor Air Sample Location
- Sheet Pile Wall
- Occupied Buildings Not Under Positive Pressure
- Occupied Buildings Under Positive Pressure
- AOI Boundary

Notes:
1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
3. Indoor air samples referenced from "Evaluation of Specific Volatile Organic Compounds in Occupied Buildings on the Philadelphia Refinery Properties" completed by Stantec, December 14, 2012.

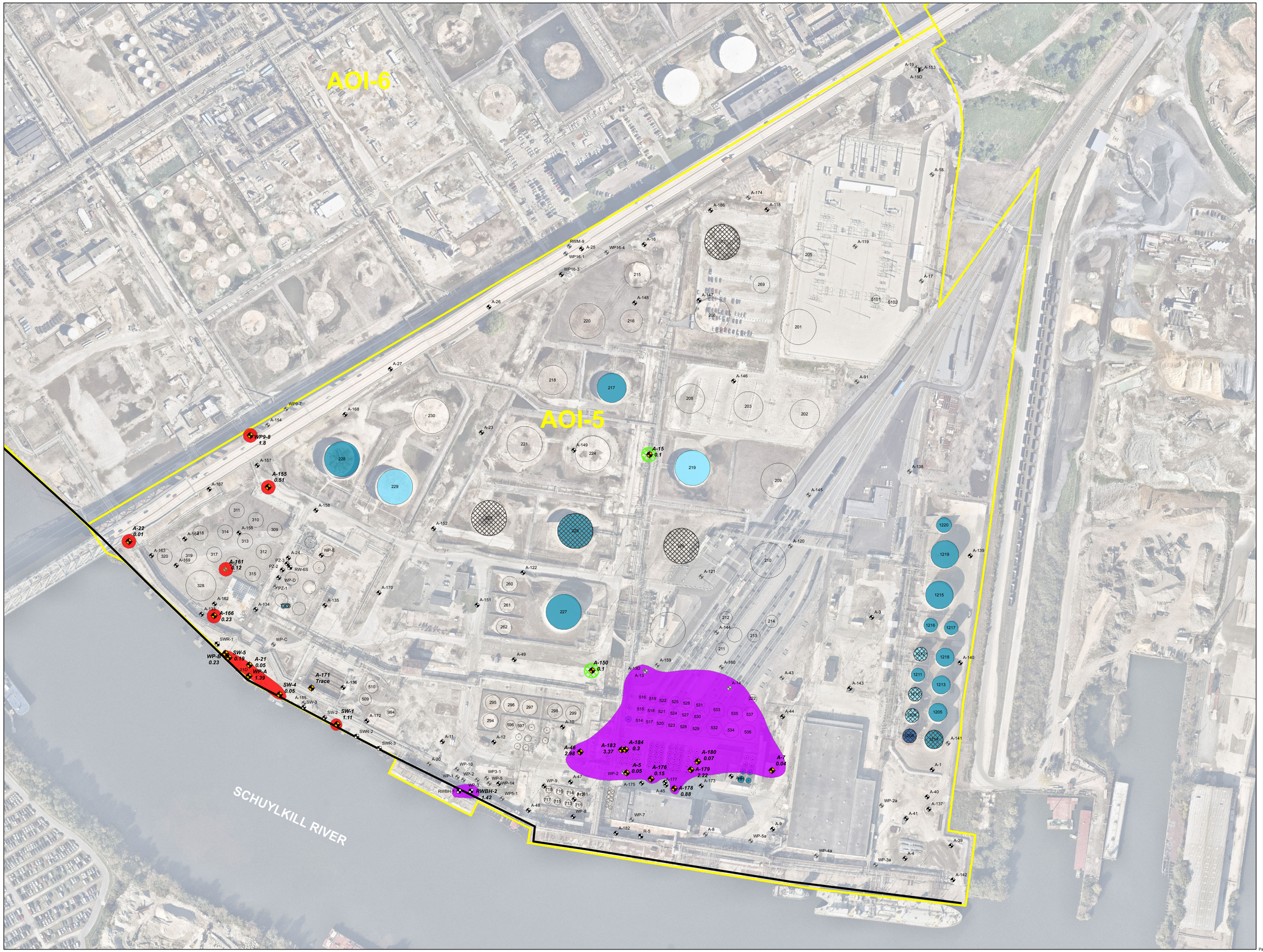
Figure 11 - Summary of Indoor Air and Outdoor Worker Ambient Air Sample Locations
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Philadelphia Refinery Operations
A Series of Evergreen Resources Group, LLC.
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 70 140 280 Feet

SCALE: 1"=140'
DATE: 11/28/2016
DRN. BY: AJC
CKD. BY: KM
JOB#: 2574602

Path: \\Langan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 11 - AOI5 Indoor Air Sample Locations_112316.mxd



Legend

- Unconfined Aquifer Monitoring Well with Apparent LNAPL Thickness (ft.)
- Lower Aquifer Monitoring Well
- Unconfined Aquifer Monitoring Well
- Unconfined Aquifer Piezometer
- Unconfined Aquifer Recovery Well
- Monitoring Well Abandoned/Damaged/ Unable to Locate
- Sheet Pile Wall
- Closed in Place
- Closed in Place Tank With Open Incident
- Active Tank With Open Incident
- Removed Tank With Open Incident
- Tank Currently Out of Service
- Tank In Service
- Removed Tank
- AOIs
- Result Exceeds PADEP Non-Residential Used Aquifer MSC TDS<2500 mg/L

LNAPL Types

- Middle Distillate
- Heavy Distillate
- Unknown

Notes:

1. Aerial imagery provided by Nearmap.com as is dated 07/29/15.
2. Area of Interest boundaries referenced from 2011 ALTA/ACSM Land Title Survey, prepared for Sunoco Inc. (R&S).
3. Groundwater gauging completed in October, 2014, by Aquaterra.
4. LNAPL thicknesses shown for RWBH-1 and RWBH-2 are from the November 2015 gauging event.

Figure 12: Apparent LNAPL Thickness and Type
AOI-5 Remedial Investigation Report
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Evergreen Resources Management Operations
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 150 300 Feet

SCALE: 1" = 150'
DATE: 11/23/2016
DRN. BY: AJC
CKD. BY: KM
JOB#: 2574602

Path: \\langan.com\data\DYL\data\62574601\ArcGIS\MapDocuments\AOI 5 RIR 2016\Figure 12 - Apparent LNAPL Thickness_112316.mxd